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Cerebral Toxoplasmosis in People Living With HIV: Mortality and Factors Associated with Death

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Abstract

Background: Toxoplasmosis is one of the main opportunistic infections during HIV infection. Its cerebral localisation in immunocompromised patients is severe. In HIV-infected patients, in-hospital mortality remains high. In Senegal, this condition poses a problem both in terms of diagnosis and treatment.

Methods: We conducted a retrospective study of descriptive and analytical purposes of patients hospitalised for cerebral toxoplasmosis with an underlying HIV/AIDS condition, in the infectious and tropical diseases department of Fann Teaching Hospital.

Results: We collected 78 patients over a six-year period range from 1 January 2012 to 31 December 2017. The average age was 44 years with a sex ratio of 1.29. In 54% of cases, cerebral toxoplasmosis was the reason of HIV discovery. The symptoms featured poor general condition with focal signs (82%), fever (27%), headache (62%), consciousness impairment (55%), meningeal signs (27%), and convulsions (17%). The most common opportunistic infections were of digestive (58%) and neurological (17%) localisations. Paraclinical investigations outlined that 95% of patients underwent a full blood count that revealed anaemia in 64% of cases. Toxoplasma serology was positive in 21% of patients. Cerebral CT scans in 71% of cases showed single (25%) and multiple (35%) abscesses. Seventy-three percent of the patients were severely immunocompromised with a mean LTCD4 level of 99 cells/mm^3. All patients received a curative dose of cotrimoxazole. Adherence to anti-toxoplasma treatment was good in 71% of cases, and 53% of our study population were on ARV treatment. The overall outcome was unremarkable in 71% of cases, with a case fatality rate of 24%. Temporo-occipital lesions (p=0.014), late initiation of cotrimoxazole (p=0.000) and poor compliance with antitoxoplasmic therapy (p=0.021) as well as ARV regimen (p=0.012) were correlated to death with a statistically significant difference.

Conclusion: In our regions, this condition is a diagnostic and therapeutic concern related to the difficulty to perform medical imaging examinations that are not always accessible and to the fact that reference treatment is expensive and not always available. It would therefore be wise to make diagnostic and therapeutic means more affordable.

Keywords: Cerebral; Toxoplasmosis; Mortality

Introduction

Toxoplasmosis is one of the major opportunistic infections during HIV infection. Infection of the immunocompetent host often goes unnoticed and has no impact on the health status. Unlike, a cerebral involvement in the immunocompromised patients leads to severity, which can lead to admission to intensive care regarding the neurological disorders and related-complications, particularly respiratory features. During HIV-related immunodepression, cyst reactivation or a primary infection in the host may occur; both of which give rise to toxoplasmosis, with cerebral location in the majority of cases, which is serious and even fatal if left untreated. Regarding the epidemiology, the seroprevalence of Toxoplasma gondii varies greatly from country to country (22.5% in the USA, 71% in France) [1]. The incidence of toxoplasmosis in the general population is difficult to assess because infection is most often asymptomatic. Nevertheless, in HIV-infected patients, in-hospital mortality remains high and is close to 24% in severe forms admitted to intensive care [1]. A remarkable outcome (survival without neurological sequelae at D90) is noted in approximately 50% of patients. Despite the introduction of antiretroviral treatment, mortality at one year is very high, ranging from 18 to 23% depending on the study [1].

On clinical approach, the presentation varies from one individual to another depending on their health state. Looking to the paraclinic, diagnosis confirmation requires fairly expensive devices [2], including a CT scan with injection of a contrast agent, which is the first-line examination. Magnetic Resonance Imaging (MRI) is an essential complement to this investigation and allows the number, size and limits of the lesions to be determined. A positive Toxoplasma gondii serology in the serum is a core diagnosis element (otherwise, the infection is unlikely, but remains possible).

Regarding therapeutic approach, important headways have been made in recent years, particularly with the occurrence of antiretroviral new combinations and prophylaxis with pyrimethamine and sulphadiazine combination, by per so or nasogastric feeding tube. Sometimes folinic acid is added for preventive purpose of haematological toxicity from pyrimethamine. In case of intolerance to sulfadiazine, a combination of pyrimethamine, clindamycin and folinic acid may be proposed [1]. These advances have downright reduced the incidence of toxoplasmosis in HIV-infected patients. However, the number of cases of cerebral toxoplasmosis occurring in these patients is still close to 200 per year.

The diagnostic issues and the considerable representative mortality rate have made it useful to consider the various factors that may increase the incidence of toxoplasmosis-related deaths during HIV infection. In addition, scarce studies on cerebral toxoplasmosis in People Living with HIV (PLHIV) have been conducted at the Infectious and Tropical Diseases Department of Fann Teaching Hospital. The last one scrolled

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back to 2011. Moreover, the change in the strategy of HIV management with the availability of antiretroviral drugs on the one hand and the test and treat strategy (TATARSEN in Senegal) on the other hand, led us to consider it useful to analyse the influence of these changes on the prognosis of cerebral toxoplasmosis.

Methods

We report a retrospective study of descriptive and analytical purposes considering the records of patients hospitalised during the period range from 1 January 2012 to 31 December 2017.

All patients hospitalised at the SMIT with a diagnosis of cerebral toxoplasmosis associated with a proven HIV infection were included in this study.

The diagnosis of cerebral toxoplasmosis/HIV was made on the basis of the following arguments constellation:

• Epidemiological: all HIV positive patients regardless of age and sex

• Clinical: essentially neurological symptoms (Bergman's triad)

• Paraclinical: a brain CT scan with strongly suggestive images with or without positive toxoplasmic serology

• Therapeutic and evolutionary: a remarkable evolution under trial treatment with Cotrimoxazole in curative dose

The notion of good compliance with Cotrimoxazole treatment is used when the number of doses of Cotrimoxazole missed during the week preceding the consultation was less than 4. Thus, compliance is considered poor when the number of doses missed during the week preceding the consultation is greater than or equal to 4. Data were entered using Epidata 3.1 software and their exploitation was possible using Stata 15 software. A descriptive study was first carried out on the basis of socio-demographic data. Continuous variables were expressed as median and extremes or as mean ± standard deviation, and categorical variables as proportions and confidence intervals, depending on the conditions of applicability. We consider a difference to be statistically significant for a $p<0.05$.

Results

During the study period, range from 1 January 2012 to 31 December 2017, 5995 patients were hospitalised in the department, of whom 1977 were HIV-positive, corresponding to a proportional morbidity of 33%. We recorded 78 cases of cerebral toxoplasmosis, accounting for a hospital frequency of 4% of all HIV-infected patients.

Epidemiological features

More than half of our study population was male (56.41%) with a sex ratio of 1.29. The mean age was 44.40 ± 11.58 years (17 and 80 years). The majority of the subjects were between 40 and 60 years of age and almost half (45%) were from the suburban area. They were mostly married (55%), monogamous in 35% of cases and polygamous in 20% of cases. Hospitalization was the circumstance of discovery of their retroviral status for more than half of the patients (54%), while in 46% of the cases, an opportunistic infection prior to their hospitalization was the circumstance of discovery of their serological status. The majority of patients (68%) had no comorbidities on admission.

Clinical features

Fever (73%), poor general condition with focal signs including sensory-motor deficits, phasic disorders and a cerebellar syndrome (82%), headaches (62%), consciousness disorders (55%) and convulsions (17%) were found. In addition, 27% of them showed signs of meningeal impairment (Table 1). Opportunistic infections were noted in the digestive tract (58%), the lungs (14% of pulmonary tuberculosis cases) and neurological infections such as neuromeningeal tuberculosis (10.26%), neuromeningeal cryptococcosis (4%) and viral encephalitis (CMV, HSV and HIV) (3%).

Signes cliniques	Absolute frequency (n)	Relative frequency (%)
Fever	57	73,08
AEG	64	82,05
Headache	48	61,54
Convulsions	13	16,67
Consciousness disorders	43	55,13
Focal signs	64	82,05
Meningeal signs	21	26,92
Total	78	100,00

Table 1: Distribution of the study population according to symptomatology. Cerebral toxoplasmosis in PLHIV. Department of infectious diseases at fann hospital 2012-2017 (n=78).

Paraclinical features

Anemia was present in 64% of cases and the mean hemoglobin level was 9.97 g/dl ± 2.08 (4-14 g/dl). The CRP level was very high in 38% of cases with a mean of 64 ± 82 (17 to 459). Serum creatinine level was normal in the majority of patients (71%). The majority (73%) was severely immunocompromised with a mean LTCD4 level of 98.85 cells/mm^3 ± 104.7 (1-412 cells/mm^3).

Toxoplasma serology was performed in 19 patients and came back positive for IgG in 16 of them, standing for 21% of cases. Old immunity to toxoplasma gondii was noted in 19% of cases. Among the 55 patients who underwent brain CT scans, 36% had fronto-parietal lesions, 13% had temporo-occipital lesions and 22% had diffuse lesions. Of these 55 patients, 60% had images of brain abscesses (n=33). One quarter (25%) had single abscesses and 35% had multiple abscesses. In addition, 5% had ventricular dilatation and 31% had a mass effect. Complications (signs of subfalcoral involvement or displacement of midline structures) were seen in 10 patients (18%). Some patients who underwent toxoplasma serology did not necessarily experience a brain scan and vice versa.

Evolutionary and therapeutic features

More than half of the patients, representing 64%, returned home, compared with 5% who were transferred to other health facilities for further care, 1% were lost to follow-up and 26% died. In 4% of cases, this modality was not indicated. Side effects, mainly digestive involvement, were reported in 6% of patients under cotrimoxazole. In one third of cases, this mode was not indicated or the adverse effects were not investigated. The majority of patients (70.51%) put on cotrimoxazole had good compliance.

Among the 43 patients under ARVs, almost half were on the regimen: TDF+3TC/FTC+EFV (42%), we also count patients who were put on TDF+3TC/FTC+Lopinavir/ritonavir (5%) and AZT+3TC/FTC+LPV/r (2%). It should also be noted that during this period, the TLD-based ARV regimen was not used in Senegal. A total of 32% were cured without sequelae, 71% had sequelae, and 24% died.

Analytical study

Regarding death occurrence, there was no statistically significant difference in relation to sex ($p=0.703$), age ($p=0.309$), existence of underlying condition ($p=0.5$), risk factors ($p=0.604$). No clinical sign: fever

(p=0.401), poor general state (p=0.232), convulsions (p=0.115), focal signs (p=0.685) influenced the occurrence of death, there was no statistically significant difference. However, we note the threshold value of p=0.053 for the existence of disorders of consciousness. The level of LTCD4 did not influence the occurrence of death either, there was no statistically significant difference (p=0.692).

Death occurrence with a statistically significant difference was correlated to the topography of the lesions (temporo-occipital lesions) (p=0.014), to the duration of the Cotrimoxazole treatment (deaths more marked in the first two weeks) (p=0.000) (Tables 2 and 3). Adherence to Cotrimoxazole treatment also influenced the occurrence of deaths, with a statistically significant difference (p=0.021), as did the ARV treatment regimen (p=0.012). Thus, deaths were much more frequent in patients who were not under PI-based ARV regimen (Tables 4 and 5).

Topography/Death	Fronto/ Pariétal N (%)	Temporo/ Occipital N (%)	Diffuse N (%)	Total N (%)	
Yes	0 (0,00%)	3 (42,86%)	3 (25,00%)	6 (15,38%)	p=0,014
No	20 (100,00%)	4 (57,14%)	9 (75,00%)	33 (84,62%)	
Total	20 (100,00%)	7 (100,00%)	12 (100,00%)	39 (100,00%)	

Table 2: Relationship between topography of lesions and death. Cerebral toxoplasmosis in PLHIV infectious diseases department at fann hospital, Dakar 2012-2017 (n=39).

Duration/Death	0 à 7 jours n (%)	7 à 14 jours n (%)	14 à 21 jours n (%)	21 jours et plus n (%)	Non Précisé n (%)	
Yes	0 (0,00%)	3 (42,86%)	3 (25,00%)	6 (15,38%)	0 (0,00%)	p=0,000
No	20 (100,00%)	4 (57,14%)	9 (75,00%)	33 (84,62%)	6 (100,00%)	
Total	20 (100,00%)	7 (100,00%)	12 (100,00%)	39 (100,00%)	6 (100,00%)	

Table 3: Relationship between duration of treatment with cotrimoxazole and death. Cerebral toxoplasmosis in people living with HIV infectious diseases department at fann hospital, Dakar 2012-2017 (n=78).

Adherence/Death	Good n (%)	Poor n (%)	Total n (%)	
Yes	8 (14,55%)	1 (100,00%)	9 (16,07%)	p=0,021
No	47 (85,45%)	0 (0,00%)	47 (83,93%)	
Total	55 (100,00%)	1 (100,00%)	56 (100,00%)	

Table 4: Relationship between adherence to cotrimoxazole treatment and death. Cerebral toxoplasmosis in people living with HIV infectious diseases department at fann hospital, Dakar 2012-2017 (n=56).

ARV Regimen/ Death	AZT+3TC/ FTC+EFV n (%)	AZT+3TC/ FTC+NVP n (%)	AZT+3TC/ FTC+LPV/r n (%)	TDF+3TC/ FTC+EFV n (%)	TDF+3TC/ FTC+LPV/r n (%)	Non Précisé n (%)	
Yes	3 (33,33%)	1 (16,67%)	0 (0,00%)	2 (11,11%)	1 (50,00%)	6 (85,71%)	p=0,012
No	6 (66,67%)	5 (83,33%)	1 (100,00%)	16 (88,89%)	1 (50,00%)	1 (14,29%)	
Total	9 (100,00%)	6 (100,00%)	1 (100,00%)	18 (100,00%)	2 (100,00%)	7 (100,00%)	

Table 5: Relationship between ARV treatment regimens and death. Cerebral toxoplasmosis in PLHIV infectious diseases department at fann hospital, Dakar 2012-2017 (n=56).

Discussion

The incidence of cerebral toxoplasmosis has decreased considerably with the advent of antiretroviral drugs and the introduction of cotrimoxazole chemoprophylaxis [3]. Some African authors have reported a high prevalence of cerebral toxoplasmosis in their studies using clinical, serological and especially therapeutic arguments.

In Senegal, the study by Cissoko et al. [2], carried out in the same department over a three-year period (2008-2010), recorded 26 cases of cerebral toxoplasmosis. In Burkina Faso, Millogo et al. [4], over a period of three years, retained 54 cases of cerebral toxoplasmosis in a series of 75 patients with a cerebral mass and positive retroviral serology (HIV+). In Morocco, a retrospective study from January 2007 to January 2014, conducted in the infectious diseases department of the Mohamed VI University Hospital in Marrakech, found 21 cases of probable or confirmed toxoplasmosis out of 453 HIV positive patients [5].

In our series, the prevalence of cerebral toxoplasmosis in HIV positive patients was 4%. This rate is very low compared to the 24.5% found by Bossi in a study carried out in France [6], but it should be noted that this French study was carried out in 1994. Nevertheless, our results are comparable to those found in the sub-region (Senegal, Mali

and Benin) respectively by Cissoko et al. [2], Avoide et al. [7], Goita et al. [8] with prevalences of 2.7%, 3.5%, and 2.8% and in Morocco by Taoufik [5] with a prevalence of 4.63%.

The mean age of our patients was 44.40 years old. The age group between 40 and 60 years was predominant (52.56%). These data are similar to those reported by other authors: Indeed, in Senegal Mouhatta [9] found a mean age of 43 years old and Cissoko et al. [2], 41.5 years old. A study performed at the Hospital Principal in Dakar by Ba found a mean age of 44.5 years old [10]. Another older retrospective study by Diop [11], also carried out in Senegal, found a mean age of 41 years. Elsewhere, in Burkina Faso, Martinique and Morocco, Millogo et al. [4], Bourée et al. [12] and Taoufik [5] found mean ages of 38, 40 and 38 years old respectively.

The predominance of this age group can be explained by the fact that this group is the most sexually active. Thus, young adults remain the population most at risk of HIV infection [7]. As regards gender, the clear male predominance found in our work with a sex ratio of 1.29 was also noted elsewhere in Burkina Faso, Morocco and Martinique in the study by Millogo et al. [4], Taoufik [5] and Bourée et al.[12] with a sex ratio of 1.7, 2 and 3.3 respectively. On the other hand, in Senegal Mouhatta et al. [13] found an equal distribution between men and women with a sex ratio of 1 and Cissoko et al. [2] a female predominance with a sex ratio (F/H) of 1.4. However, the results of Ba [10], also in Senegal, were similar to ours, with a male predominance and a sex ratio of 2.

In our series, married people were the most infected (55.13%). According to the literature, in developing countries, HIV transmission is heterosexual and mainly occurs between spouses in stable couples. In our study population, the most frequent risk factor for transmission was multiple sexual partners (24%). We should take into account that in 50% of cases, this value was not indicated due to the taboo nature of the subject in our countries. This remark is constant in all African series, notably that of Bissagnene et al. [14].

Clinically, a history of opportunistic infections was found in 46% of our patients, dominated by neurological infections in 24% of cases. The study reported by Cissoko et al. [2], conducted in Dakar region, found that 14.4% of patients underwent an opportunistic infection with a neurological involvement. In 53.85% of cases, cerebral toxoplasmosis was the reason of HIV infection discovery, which is similar to the study by Cissoko et al. [2] with 58% and that of Touafik in Morocco [5] with 57%.

The majority of patients presented a febrile focal neurological clinical picture in a context of poor general state. The latter was found in 82% of our patients, while fever was present in 73% of cases. In Senegal, these results are similar to those of Mouhatta [9], Cissoko et al. [2] and Ba et al. [10] who found 84.6%, 88% and 88.8% of patients with fever respectively.

However, elsewhere in Africa, other authors have noted fewer febrile forms. Thus, in the sub-region (Benin and Togo), Zannou et al. [15] and Grunitzky et al. [16] noted 58.8% and 37.9% cases of fever respectively. In Morocco, Taoufik [5] found 22% cases of fever. In Europe and the West Indies (Spain and Martinique) Gonzalez et al. [17] and Bourée et al. [12] found 52.6% and 48% cases of fever respectively.

The rate of patients with headache (62%) in our series is similar to that of Atangana (66%) in Cameroon (60%), lower than that of Cissoko et al. [2] (77%), Ba [10] (100%) and higher than that of Mouhatta [9] (38.5%). Seizures were present in 17% of our patients. Other authors reported different results and even higher rates such as Mouhatta [9] 42.3%, Diop [11] 50%, Ndour et al. [18] 52% and Touafik [5] 38%. Consciousness disorders including comas and obnubilations were found in more than half of our patients (55%). Our results are similar to those of Mouhatta [9] and Cissoko et al. [2] in Dakar, with 53.8% and 61% respectively, and are higher than those of the Moroccan study by Touafik [5] 38%, Ba [10] in Senegal, 11%, Grunitzky et al. [16] in Togo, who found 12.1%, and Zannou in Benin with 20% [15]. Focal signs including sensory-motor deficits, phasic disorders and cerebellar syndromes were present in 82% of our patients. These results corroborate with those of Touafik, which is 80% [5]. In Senegal, Ndour et al. [18] and Cissoko et al. [2] found a motor deficit in 62% and 64% respectively. Elsewhere, in Togo and Spain, Grunitzky et al. [16] and Gonzalez-Clement et al. [18] reported motor deficit in 62.1% and 62.8% respectively. However, this result is superior to that of Bourée et al. [12] in Martinique who found motor deficit in 35.6% of patients. Meningeal signs were found in 27% of cases, higher than those found in Touafik's study (4.7% of cases) [5].

These differences and similarities in the frequency of the various signs noted express the clinical broad spectrum of cerebral toxoplasmosis. They depend not only on the stage of diagnosis of the condition but also on the terrain in which the condition occurs.

In regards of digestive infections, our study found candidiasis in 37% of cases. Mouhatta [9] found a lower result than ours (19.3%), but Ndour et al. [18] were able to detect a higher number of patients, 76% and Touafik [5] 45%. Looking at the pulmonary involvement, our study shows that 14% of patients had pulmonary tuberculosis, Ndour et al. [18], Mouhatta [9] and Cissoko et al. [2] found respectively 19%, 11.5% and 7.69% of tuberculosis in their patients while Touafik [5] reported 28%. As neurological concerns, three cases of neuro-meningeal cryptococcosis (4%) have been reported. Cissoko et al. [2] found only one case.

According to the biology, 64% of the patients presented anaemia with a mean haemoglobin level of 9.97 g/dl. In Senegal, Mouhatta [9] and Cissoko et al. [2] found almost similar results with respectively 78.26% and 54% anaemia and a mean haemoglobin level of 9 g/dl and 9.65 g/dl respectively. Ndour et al. [18] found 100% anaemia and mean haemoglobin of 8.6 g/dl as reported in Doudou's series [11] with a rate of 100% and a mean of 9 g/dl. In Benin, Avode et al. [7] noted anaemia in 40% of patients, and 47.6% with Touafik [5] in Morocco. Concerning the LTCD4 level, 85% of our patients presented an immunodepression among which 73% with a severe immunodepression (CD4<350 cells/mm^3). Our figures are similar to those of Touafik [5] with an average rate of 55.78 cells/mm^3 and 85% of these patients had an LTCD4 rate lower than 100 cells/mm^3. We note that the LTCD4 level remains low, reflecting the degree of severe immunosuppression in most of these patients. Nineteen patients (24%) underwent toxoplasmic serology, which was positive in 16 patients (21%). This rate is similar to that of Cissoko et al. in their study in Senegal [2] who found positive serology in 23% of cases. But this data was low compared to that of Taoufik in Morocco [5] with 71.42%.

Brain Computed Tomography (CT) remains the first-line examination. It is carried out with and without injection of contrast agent, hence allowing to appreciate the importance of the peri-lesional oedema and to identify a mass effect [19,20]. However, in our context it is still inaccessible for most patients due to its high cost. In our study, brain CT scans performed on 55 patients outlined fronto-parietal (36%), diffuse (22%) and temporo-occipital (13%) lesions. These results are similar to those of Cissoko et al. [2] who recorded a parietal topography in 30.76% of cases, frontal and temporal in the same proportions, standing for 23.07% and occipital in 11.53%. Brain abscesses were

the most frequent lesions (60%) with annular contrast. In Morocco, Taoufik [5] found only 14% of cerebral abscesses. The lesions were more multiple (34.55%) than single (25.45%). These results are similar to those of Doudou [11], Gonzalez-Clément et al. [17], Bourée et al. [12] and Cissoko et al. [2], who found more multiple lesions but at higher proportions, corresponding to 83.3%, 70%, 70.3% and 71% respectively. However, they differ from those of Mouhatta [9] who found 50% single lesions and 50% multiple lesions and those of Avode et al. [7] in Benin and Grunitzky et al. [16] in Togo who found a predominance of single lesions with rates of 66.6% and 78.2% respectively. This difference may explain the higher number of neurological disorders in our study population.

Considering therapeutic and evolutionary aspects, aetiological treatment with cotrimoxazole was conducted in all of our patients, which is consistent with Mouhatta's study [9]. The combination of sulfadiazine and pyrimethamine, although it is the reference treatment [21], was not used in any of our patients, likely because of its inaccessibility in our developing countries.

About the evolution, 71% of cases were cured. We coded 19 cases of death represeting a case-fatality rate of 24.36%, which is similar to that found by BA et al. [10] (22.2%). Similarities were found in the literature with the work of Cissoko et al. [2], Mouhatta [9], Ndour et al. [18], Grunitzky et al. [16] where the evolution was favourable with rates of 57.7%, 69.2%, 71.4% and 87.7% respectively. Lethality in our study was at a lower rate compared to studies by other authors such as Ndour et al. (86=18) 28.6% Balougou et al. [22] 36% Mouhatta [9] 46.2% and Soumaré et al. [23] 75%.

These similarities found in various studies confirm the efficacy and good short-term tolerance of cotrimoxazole as the average duration of treatment was about 21 days in most studies. Due to the retrospective nature of our study, the evaluation was not really continued after discharge.

During cerebral toxoplasmosis in HIV, deaths can occur at any time during the disease evolution. In one hand, they are related to the severity of the clinical presentation when immunodepression is very severe, and on the other hand to the short duration of treatment with Cotrimoxazole. Few studies have looked specifically at all the causes of death. In our study, 24.36% of patients (n=19) died. About the factors influencing the occurrence of death, out of the 43 patients with consciousness disorders (obnubilation, coma), we recorded 14 deaths, accounting for a lethality of 32.56%, with a limit value of p=0.053. In patients who did not have consciousness disorders, five cases of death (14.29%) were reported. In the study by Cissoko et al. (79=2), no deaths were recorded in patients without consciousness impairment (eight cases) whereas the case fatality was 58% in comatose patients (p=0.02). Despite the difference in percentage we can conclude that disorders of consciousness are indeed involved in the occurrence of death.

The topography of the lesions (more marked for temporo-occipital lesions) (p=0.014), the duration of Cotrimoxazole treatment (more marked in the first two weeks) (p=0.000), poor compliance with Cotrimoxazole treatment (p=0.021), and the ARV treatment regimen (patients not on a PI-based regimen) (p=0.012) influenced the occurrence of deaths with a statistically significant difference.

This allows us to confirm the efficacy of Cotrimoxazole treatment over a well-defined period of at least 21 days. Elsewhere, contrary to the study conducted by Cissoko et al. in 2013 [2], anaemia did not influence the occurrence of death (p=0.321).

Conclusion

The incidence of cerebral toxoplasmosis in the general population is difficult to assess, as the infection is most often asymptomatic. Nevertheless, in HIV-infected patients, in-hospital mortality remains high and easily reaches 24% in severe forms admitted to intensive care. In Africa, and particularly in Senegal, this condition still poses a problem of diagnostic approach, notably because of the difficulty of carrying out medical imaging examinations, in this case brain scans and MRIs, which are not always accessible to our population, and also a therapeutic problem because the reference treatment (Sulfadiazine-Pyrimethamine) is both very expensive, not always available and of limited prescription because of its hematological toxicity. For these reasons, it will be necessary to think about making diagnostic (cerebral CT) and therapeutic (cotrimoxazole in all forms, but especially the injectable form) means available and financially more accessible, and to emphasize on cotrimoxazole chemoprophylaxis in immunocompromised PLHIV.

References

1. Magalhaes E, Mourvillier B, Neuville M (2015) Cerebral toxoplasmosis. Intensive care 24:337-343.
2. Cissoko Y, Seydi M, Deguenonvo L (2013) Current profile of cerebral toxoplasmosis in hospitals in Dakar. Med et Santé Tropicale 23:197-201.
3. Moulignier A, Moulonguet A (2007) Neurological manifestation in HIV: P-M Girard, C Katlama, G Pialoux (eds) 7th, edition, Paris, Doin pp: 98-101.
4. Millogo A, Sawadogo AB, Lankoa (2001) Diagnostic problems of intracranial expansive processes in patients infected with HIV at the Bobo-Dioulasso hospital center (Burkina Faso). Bull Soc Path Exot 94: 315-318.
5. Taoufik L (2015) Cerebral toxoplasmosis in patients infected with the human immunodeficiency virus followed by the infectious diseases department at the mohammed vi marrakech university hospital. Thesis. Med N°64.
6. Bossi P, Caumes E, Astagne P (1998) Epidemiological characteristics of cerebral toxoplasmosis in 399 patients infected with HIV followed between 1983 and 1994. Rev Med Interne 19: 313-317.
7. Avoide D, Adjien C, Houinato D (2005) Cerebral toxoplasmosis in hospitals in Cotonou (Benin). AJNS 24: 48-55.
8. Goita D, Karambe M, Dembele J (2012) Cerebral toxoplasmosis during AIDS in the infectious diseases department of the chu du point-g, bamako-mali. Mali Medical 26: 47-50.
9. Mouhatta O (2011) Cerebral toxoplasmosis in the immunocompromised: epidemiological, clinical, paraclinical, therapeutic and evolutionary aspects. Thesis Med UCAD Dakar N°150.
10. Ba PS, Niang A, Lawson ST (2000) Cerebral toxoplasmosis in HIV field Infectious diseases department, Hôpital Principal, HPD medicine department PO Box: 3006 Dakar star Senegal page 5.
11. Diop D (2005) Cerebral toxoplasmosis during AIDS: about 12 observations collected at the CHU of Fann and at the Hôpital Principal of Dakar from 2000 to 2003. Thesis Med Dakar N °121.
12. Bouree P, Dumazedier D, Magdeleine C (1997) Cerebral toxoplasmosis and AIDS in Martinique. Med Trop 57: 259-261.
13. Dumas M, Gordans C, Gentilini M (1994) Tropical Neurology. Edition John Libby Euro text 5:91-133.
14. Bissagnene E, Dariosecq JM, Inwoley A (2009) HIV/AIDS therapeutic guide in Africa 2009 WHO classification (2006 revised version) page 30.
15. Zannou DM, Kinde-Gazard D, Vigan J (2004) Clinical and immunological profile of HIV infected patients screened in Cotonou, Benin. Med Mal Infect 37: 225-228.
16. Grunitsky E, Balogou A, Vimegnon Y (1999) Cerebral toxoplasmosis in hospitals in Lomé (Togo). Bull Soc Path Exot 88: 22-23.
17. Gonzalez-Clemente J, Miro J, Alvarez R (1990) Encephalic toxoplasmosis in patients with the acquired immunodeficiency syndrome. A clinico-radiological study and the therapeutic result in 78 cases. Med Clin 95:441-446.

18. Ndour C, Nyambawasa D, Manga N (2008) The Trimithoprime-Sulfamethoxazole combination in the curative treatment of cerebral toxoplasmosis during AIDS in Dakar. Med Afr Nr 55: 176-180.

19. Morlat P, Ragnaud J, Gin H (1993) Cerebral toxoplasmosis during AIDS. Med Mal Infect 23:183-189.

20. Malso C, Girard PM (1996) Pulmonary pneumocystosis and cerebral toxoplasmosis in the subject infected with HIV. Rev Prat 46: 2109-2014.

21. Leport C, Remington J (1992) Toxoplasmosis in AIDS. Presse Med 21: 1165-1171.

22. Balougou Ak, Volley K, Belo M (2007) Mortality of HIV positive patients in the neurology department of the Lomé campus university hospital (Togo). AJNS 26: 27-32.

23. Soumare M, Seydi M, Diop SA (2009) Parasitic and fungal neuro-infection at the infectious diseases clinic in Dakar. Mali Med 24:31-34.