Original Research Article

Clinical characteristics and treatment outcomes of HIV+ and HIV- tuberculosis patients followed and treated at the regional hospital of Oyem, Northern Gabon: a two-year retrospective study.

Abstract

Background: The objective of this study was to analyse the clinical characteristics of HIV+ and HIV- tuberculosis patients followed and treated at the Oyem Regional Hospital Centre (ORHC).

Materials and Methods: During this study conducted between January 2019 and December 2021, data collection was based on the exploitation of medical records and registers of results from the medical analysis laboratory of the regional hospital of Oyem, in which there were personal data (gender and age) of the patients, the status of HIV infection, clinical characteristics (pulmonary or extra pulmonary TB), and finally, the therapeutic outcomes of the patients after anti-tuberculosis and antiretroviral treatment. Binomial test following the Normal distribution was used to find an association between the percentages of extrapulmonary TB and TB+/HIV+ co-infection

Results: In this study, 128 confirmed TB cases were selected. While 54 (42.19%) were co-infected with TB+/HIV+, 74 patients (57.81%) were monoinfected with TB+/HIV+. Among all these patients, 93 (72.66%) were reported to have extra pulmonary TB and 35 (27.34%) had pulmonary TB. A normal binomial test showed that TB+/HIV+ co-infection was significantly associated with extrapulmonary TB (p=0.04). Patients were put on anti-tuberculosis treatment according to the manufacturers' indications. Despite a total of 15 deaths (8.93%) in both mono- and co-infected patients, there was a favourable outcome, with 35 patients (27.34%) declared cured. With 8 deaths, mortality was higher in the co-infected than in the non-HIV infected TB patients who recorded 7 deaths..

Conclusion: By indicating a relatively high prevalence of HIV infection in TB patients, this study showed that TB+/HIV+ co-infection was associated with extra pulmonary TB, the severe form of the disease, and increased mortality in patients, hence the need to strengthen joint activities to control this co-infection.

Key words: Infection, Co-infection, TB, HIV, Oyem, Northern, Gabon

I. Introduction

The COVID-19 pandemic has reversed years of global progress in TB control and, for the first time in more than a decade, TB deaths have increased, according to the World Health Organization's (WHO) Global TB Report 2021 [1]. The WHO estimates that in 2018, 1.5 million people died from TB, more than from any other single infectious agent [2]. TB is present in all regions of the world. In 2020, the WHO region with the highest number of new TB cases was South-East Asia (43% of all new cases), followed by the African Region (25%) and the Western Pacific Region (18%) [1]. In recent years, HIV infection is a major risk factor for *Mycobacterium tuberculosis* infection. As if the burden imposed on populations by TB is not enough, its association with HIV is responsible for high mortality among people living with HIV. In sub-Saharan Africa, HIV is the main determinant of the increase in TB incidence over the past 10 years [3]]. With an incidence estimated by the World Health Atlas in 2019 at 521 per 100 000 inhabitants for tuberculosis [4], and an estimated national prevalence of 4.1% for HIV infection [5], Gabon is not immune to the ravages of TB/HIV co-infection. According to the WHO Stop TB/HIV programme, surveillance of TB/HIV co-infections is recommended to plan joint activities to combat TB and HIV infection [6]. Although there are few studies conducted in other regions of Gabon, none have focused on the prevalence of tuberculosis (TB) and TB/HIV co-infection in our study area. It is in this context that the Regional Hospital of Oyem in Northern Gabon was used as a setting to analyse the clinical characteristics of HIV+ and HIV- tuberculosis patients followed and treated there.

II. Materials and Methods

2.1. Data collection

During this study conducted between January 2019 and December 2021, data collection was based on the exploitation of medical records and registers of results from the medical analysis laboratory of the regional hospital of Oyem, in which there were personal data (gender and age) of the patients, the status of HIV infection, clinical characteristics (pulmonary or extra pulmonary TB), and finally, the therapeutic outcomes of the patients after anti-tuberculosis and antiretroviral treatment..

2.2. Data analysis

The data were entered in Microsoft Excel 2016 and then analysed using R software version 3.6.1. A Binomial test following the Normal distribution was used to find an association between the percentages

of extrapulmonary TB and TB+/HIV+ co-infection. A 95% confidence interval was estimated and a p-value≤ 0.05 was considered statistically significant.

III. Results

III-1 Prevalence and distribution of mono-infection (TB+/HIV-), and TB+/HIV+ co-infection in the study population.

A total of 128 cases of tuberculosis (TB) confirmed by culture on Lowenstein Jensen agar medium were included in this study. Of these, 54 (42.19%) cases were diagnosed as positive for HIV infection and confirmed by Western blot. With an average age of 34.5 years in both mono-infected (TB+/HIV-) and co-infected (TB+/HIV+) patients, the age group 30-39 years (42.97%) was the majority with percentages of 54.54% mono-infected and 45.46% co-infected, with male predominance Table 1.

Table 1: Prevalence and distribution of mono-infection (TB+/HIV-), and TB+/HIV+ co-infection according to Gender and age groups, in the study population.

Variables	TB+/HIV-		TB+/HIV+	
	Numbers	%	Numbers	%
Gender				
Male	56	59.57	38	40. 43
Female	18	52. 94	16	47. 06
Age groups (years)				
≤ 19	1	100	0	0
20 -29	7	58.33	5	41.67
30-39	30	54.54	25	45.46
40-49	21	55.26	17	44.74
≥ 50	15	68.18	7	31.82

III-2. Distribution of clinical forms of tuberculosis in TB+/HIV- and TB+/HIV+ co-infected patients in the study population

The study of the different clinical forms of tuberculosis indicated the presence of extra-pulmonary tuberculosis in 93 72.66% of the patients, compared to 35 patients (27.34%) with pulmonary tuberculosis. Furthermore, the analysis of the significance level of the differences observed in the percentage of TB infection of TB+/HIV mono-infected patients compared to TB+/HIV+ co-infected patients in the study population according to pulmonary or extra-pulmonary TB was carried out using the

exact binomial test, with a 95% confidence interval. Table 2 shows that TB+/HIV+ co-infection was significantly associated with extra pulmonary TB p=0.04.

Table 2: The different clinical forms of tuberculosis in TB+/HIV- and TB+/HIV+ co-infected patients in the study population.

Clinical forms of TB	TB+/HIV-	TB+/HIV+	Total	Binomial test		
				p(TB+/HIV+)	IC95%	p-value
Pulmonary	50	43	93	0.46	[0.35 - 0.56]	0.53
Extra pulmonary	24	11	35	0.31	[0.16 - 0.49]	0.04*
Total	74	54	128	0.42	[0.33 - 0.51]	0.09

. * Significant test

III-3. Therapeutic outcomes of patients after anti-TB and antiretroviral treatment

57.81% (n=74) mono-infected (TB+/HIV-) and 42.19% (n=54) co-infected (TB+/HIV+) patients were put on anti-tuberculosis treatment according to the manufacturer's indications. Among the mono-infected (TB+/HIV-), the therapeutic success, with declaration of cure, was 26 (35.14%) patients, 23 (31.08%) patients were undergoing treatment, the percentage of patients who abandoned the treatment was 24.32% (n=18), finally, 7 (9.46%) deaths were recorded. Among the co-infected, the therapeutic success with declaration of cure was 16.66% (n=9). 25 (46.30%) patients were undergoing treatment. 12 patients 22.22%) had dropped out or were lost to follow-up. Finally, the number of deaths was 8 (14.82%).

Table 3: Therapeutic outcomes of patients with tuberculosis.

Outcomes	TB+/HIV-		TB+/HIV+	
	(n=74)	%	(n=54)	%
Reported cured	26	35.14	9	16.66
Undergoing treatment	23	31.08	25	46.30
Discontinued and lost to follow-up	18	.24.32	12	22.22
Deaths	7	9. 46	8	14.82

IV. Discussion:

The objective of this study was to analyse the clinical characteristics of HIV+ and HIV- tuberculosis patients followed and treated at the Oyem Regional Hospital (CHRO). Contrary to the results obtained in Brazil 27.7%, Cameroon 26.06%, Togo 23.7% and even Korea 15.9% [7, 8, 9, 10, 11], the present study indicated a relatively high prevalence of HIV infection among tuberculosis patients (42.19%); which is rather close to that found in Morocco 39.3%. This diversity of results could be due, on the one hand, to the difference in the timing, season and year of the studies, the sampling of participants, socio-demographic factors, and environmental conditions in these study areas. On the other hand, the fact that the northern region of Gabon shares borders with Cameroon and Equatorial Guinea, the immigration of populations from one country to the other, can be a real obstacle to the total eradication of this infection [12]. With a total of 55 patients and a rate of 42.97%, patients in the 30-39 age group were more mono infected (54.54%) than co-infected (45.46%), compared to the other age groups. This result, although higher, is not far from the 34.24% found elsewhere in the 30-39 age group of TB/HIV co-infected patients [13]. This correlates well with the fact that this age group constitutes a category of young active adults, more often infected with most transmissible diseases such as tuberculosis or most often affected by HIV/AIDS, but more aware and active in the therapeutic follow-up of the infection [14]. As well as a guide for the management of TB/HIV co-infection of the National Tuberculosis Control Programme of the Republic of Congo in 2020, this study indicated that TB+/HIV+ co-infection was significantly associated with severe tuberculosis (extra pulmonary tuberculosis) p=0.04, and an increase in the mortality rate among tuberculosis patients. This is consistent with the results of a previous study [15]. This correlates well with the fact that once a patient's immune defences have been weakened by HIV, even latent tuberculosis patients are at risk of developing more active tuberculosis. In terms of therapeutic outcomes, the results obtained after anti-tuberculosis treatment in this study are far from meeting the expectations of the WHO, whose targets for 2030 are to reduce the number of deaths due to tuberculosis and its co-infection with HIV by 90%, and to reduce the incidence of the disease (number of new cases per year per 100,000 inhabitants) by 80% compared to 2015 [1]. With the overall cure rate of TB ranging from 71.1 to 74.4% depending on the prevalence of HIV infection in Africa [16], our study indicated a 35.14% (n=26) higher cure rate in mono-infected patients than in co-infected patients 16.66% (n=9). This may be explained by the fact that the co-infected patients in this study may have had lower than normal CD4 counts. This would have complicated treatment and the high frequency of drug intolerance or even drug interactions between anti-tuberculosis drugs (especially rifampicin) and some antiretroviral drugs observed in HIV-positive patients [17]. In total, many patients (37.5%) were still on treatment at the time of this study. This can be explained by the heavy and long duration of the

anti-tuberculosis treatment, as each TB patient is usually treated according to a treatment regimen of several months, divided into 2 phases [17 ; 18]. Even though during a national seminar, the Director of the National Tuberculosis Control Programme in Gabon (PNLT) mentioned a lack of 40% of TB patients who had abandoned treatment or lost sight of, spread throughout the country [12], this study noted a relatively low total rate of treatment abandonment of 15.62%. This result is lower than that obtained in a previous study, which found a total dropout rate of 21.5% in its study population [19]. This result can be explained not only by the fact that the Gabonese government and its partners cover the cost of the BCG vaccine, to be given during the first months of birth, but also by the geographical location of the treatment centres, which are increasingly close to the population, and the cost of anti-tuberculosis treatment and the acquisition of antiretroviral drugs are free. The overall cure rate for TB ranged from 71.1% to 74.4% in Africa, depending on the prevalence of HIV infection [14]. The mortality rate in this study was 14.82% (n=8) in co-infected patients and 9.46% (n=7) in mono-infected patients, indicating an impact of HIV infection on mortality in TB patients. These results are superimposed on those found elsewhere, which showed that TB mortality was higher in co-infected patients than in mono-infected patients [20]. Due to the confidence in the traceability of the registers made available to us for this study, no TB drug resistance was recorded in the course of this work.

Conclusion:

In spite of the fact that the Gabonese government has included the fight against HIV/AIDS among the priorities of its national health policy, the prevalence of co-infection with tuberculosis and HIV among tuberculosis patients is still high in our study region. In addition to strengthening preventive measures relating to screening, diagnosis, treatment and follow-up, the fight against this burden should truly take into account the socio-economic factors of PLWHIV.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

Limitations of the study

This study was marked by the absence of certain important data in the registers made available to us. We had to subtract missing data such as biological or socio-economic and demographic data necessary for the study. As the viral load was not available for all patients for technical reasons, we removed this

parameter. Finally, the present study is a hospital-based analysis of patients infected with TB and the results may not be generalizable.

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