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Prevalence of Diabetes in HIV-infected Patients in the Medicine Department of Sikasso Hospital

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Abstract

Introduction: Diabetes during HIV infection remains frequent and the mechanism is complex, linked both to HIV and especially to Antiretroviral Drugs (ARVs). This HIV-diabetes comorbidity increases the cardiovascular risk. This is a major public health problem. In developing countries, very few studies have been carried out on the association between diabetes and HIV. The objective of this study was to evaluate the co-morbidity of diabetes and HIV in the Medicine Department of the Sikasso Hospital.

Patients and methods: This was a prospective, cross-sectional, descriptive study from March to August 2013. The study populations were patients over 15 years old followed up in external consultation for HIV infection. Diabetes screening was performed in all patients followed for HIV. Patients with HIV and diabetes co-morbidity were included out of a population of 324 HIV patients.

Results: We collected 18 patients among 786, i.e. a hospital frequency of 2.29%. The average age was 42 years and the sex ratio was 0.2 (3H/15F). HIV1 was involved in 94.45% of cases. And 50% (9/18 cases) of the patients were WHO stage 3, 11% had a CD4 count below 200 cells/mm3. The patients were treated with ARVs in 83% of cases (15/18 cases). And the majority, 72% (13/15 cases) were on 2 nucleoside inhibitors combined with a non-nucleoside inhibitor. Diabetes was discovered after starting ARV treatment in 38.88% of cases. Type 2 diabetes was the most frequent with 77.78% (14/18 cases). The mode of discovery of diabetes was incidental in 7 cases (39%) and clinical in 11 cases (61%). Diabetes was treated with insulin in 9 cases (50%), oral antidiabetic drugs (OADs) in 7 cases (39%) and diet alone in 2 cases (11%). HIV1 viral load was performed in 7 patients on ARV treatment and 5 were undetectable. The vast majority of patients (95%, 16 cases) were in the care circuit and 5% of deaths were recorded.

Conclusion: HIV and antiretroviral treatment constitute an important risk factor for the development of diabetes cardiovascular disease.

Keywords: Diabetes • HIV • ARV

Introduction

Africa remains the region most affected by HIV infection with 25.7 million People Living with HIV (PLHIV) [1]. Significant advances in antiretroviral (ARV) therapy have led to a decrease in morbidity and mortality associated with HIV infection, with morbidity in PLHIV now common to that of the general population. The HIV virus itself as well as certain ARV treatments are associated with an increased risk of developing certain chronic comorbidities including type 2 diabetes, the prevalence of which is estimated to be 4 times higher in the PLWHIV population compared to the general population [2,3]. While risk factors for type 2 diabetes are well established in the general population [4], some specific factors have been identified in PLWHIV, such as the level of immunosuppression and ARV exposure [5,6]. The mass start of treatment of HIV-infected patients on ARVs has seen the emergence of metabolic syndrome and diabetes mellitus in these patients. The most incriminated ARVs are PIs and to a lesser extent NRTIs [7]. However, the development of diabetes in HIV positive patients also depends on classical factors such as increased age, BMI, waist circumference, presence of metabolic syndrome, poor diet or lack of physical exercise [8,9]. In Mali, as in most countries of the South, there are very few data on HIV-diabetes comorbidity. The objective of this study was to investigate the epidemiological and clinical aspects of HIV-Diabetes comorbidity in a population of PLWHA.

Patients and methods: we conducted a prospective, cross-sectional, descriptive study from March to August 2013. The study populations were patients over 15 years of age followed in outpatient clinic for HIV infection. Diabetes screening was performed in all HIV-infected patients. The diagnosis of HIV was based on the combination of two tests, a screening test (Determinate) and a confirmatory test that also allows HIV typing (Sd-Bioline) according to WHO recommendations. Diabetes was defined as a blood glucose level greater than or equal to 1.26 g/l. We included patients with both HIV and diabetes in a population of 324 People Living with HIV (PLHIV).

Results: We collected 18 diabetic patients among 324 PLWHA, i.e. a hospital frequency of 5.55%. The average age was 42 years and the sex ratio was 0.2 (3H/15F). HIV1 was involved in 94.45% of cases. And 50% (9/18 cases) of the patients were WHO stage 3, 11% had a CD4 count below 200 cells/mm^3. The patients were treated with ARVs in 83% of cases (15/18 cases). And the majority, 72% (13/15 cases) were on 2 nucleoside inhibitors combined

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with a non-nucleoside inhibitor. Diabetes was discovered after starting ARV treatment in 7 cases (39%). Type 2 diabetes was the most frequent with 77.78% (14/18 cases). The mode of discovery of diabetes was incidental in 7 cases (39%) and clinical in 11 cases (61%). Diabetes was treated with Insulin in 9 cases (50%), ADO in 7 cases (39%) and diet alone in 2 cases (11%). HIV1 viral load was performed in 7 patients on ARV treatment and 5 were undetectable. The vast majority of patients, 95% (16 cases) were in the care circuit and 5% of deaths were recorded.

Discussion: The accessibility of antiretroviral treatments has revolutionized the life expectancy of people living with the human immunodeficiency virus (HIV). However, the effectiveness of the therapies, which is essential, must be complemented by prevention and close monitoring of co-morbidities such as certain cancers, diabetes and cardiovascular diseases.

Results

In our study, we collected 18 patients with HIV-diabetes comorbidity out of 324 PLWHA followed up, i.e. a frequency of 5.55%. This rate is comparable to the results reported by other authors with an average of 4% [10,11]. Mouffok N and Bensadoun F [12] reported a frequency of 7% in their series. HIV infection may increase the rate of diabetes compared to the rest of the uninfected population due to ARV use, chronic inflammation caused by HIV and HIV-related opportunistic infections [13-16]. The female sex predominated in our series with 83.33% (3H/15F). This female predominance was reported by Diallo TS [16] and Mouffok N and Bensadoun F [12] who found 72.72% and 62.16% respectively in their series [12,17]. On the other hand, other authors reported a male predominance, notably Caroline and al: 83% (24H/5F) and HG et al: 54.54% (6H/5F) [11,18]. The average age of our patients was 42 years. This result is similar to that of Diallo TS who found an average age of 38.3 ± 12.2 years [17]. HG et al found a high frequency between 40 and 45 years [18]. The prevalence of diabetes is high (4%) given the young age of the population of HIV-positive patients treated for HIV [19]. In our series, the discovery of diabetes was incidental during the inclusion and follow-up check-up in 39% and clinical following a polyuro-polydipsic syndrome in 33% and an acute complication such as coma in 28%. The majority of cases in our series were of type 2 diabetes (78%, 14/18 cases). Type 1 diabetes and secondary diabetes represented 11% of cases each (2/18 cases). In the Diallo TS series, the clinical signs in patients were persistent fever (37%), altered general condition (54%), anorexia (61%), and weight loss (62%) [17].

This high prevalence of type 2 diabetes in PLHIV has been reported by several authors [2-6]. Duncan AD, et al. [20] highlighted the alarming prevalence of fasting blood glucose abnormalities in a cohort of ethnically diverse HIV patients with approximately 1 in 3 patients being pre-diabetic or type 2 diabetic (T2DM) and identified the role of conventional and specific risk factors in the HIV population in predicting the risk of T2DM and shows the important weight of modifiable risk factors. HIV was type 1 in 94% of our patients (17/18 cases) and there was only one case of HIV2. And 50% (9/18 cases) of our patients were WHO stage 3. The CD4 count was above 500 cells/mm^3 in 39% of cases (7/18 cases) and 11% of patients (2/18 cases) were in the stage of profound immunosuppression with a CD4 count below 200 cells/mm^3. ARV treatment was initiated in 15 patients or 83%. The regimens included 2 Nucleoside Reverse Transcriptase Inhibitors (NRTIs) plus a Non-nucleoside Reverse Transcriptase Inhibitor (NNRTI) in 13 cases or 72% and 2 nucleoside inhibitors plus a protease inhibitor (PI) in 2 cases or 11%. Diallo TS, et al. reported in their series a mean CD4 count of 163 cells/mm^3 and the patients were treated for HIV with the combination of 2 NNRTIs plus an NNRTI (67%) or a PI (33%) [17]. In the series by Duncan AD et al. [20] 48% (14/29 cases) of patients were at CDC stage C of HIV infection, the median CD4 count was 600 cells/mm3 and 97% (28/29 cases) were HIV type 1 [21].

Diabetes was discovered in the majority of our patients, i.e. 56% (10/18 cases) before starting ARV treatment and in 44% (8/18 cases) of cases after an average of 3 years of exposure to ARVs. Previous studies have reported that the prevalence of diabetes is higher in patients with a long duration of exposure to ARVs (Anti-Retroviral): 32.8% *vs.* 8.3% ($p < 0.001$) and even higher in patients aged 45 years or more, as well as those with hypercholesterolaemia or increased triglycerides [17].

Lipodystrophy and male gender are common, classic risk factors for diabetes, whereas obesity is much less frequent than in the French diabetic population (21 *vs.* 41%) [5,19,22].

Treatment (particularly first generation protease inhibitors and thymidine analogues) and the virus itself lead to insulin resistance and explain the early onset and high prevalence of diabetes in HIV-infected patients. The prevalence of diabetes is reported to be up to four times higher than in the general population [3,19,23,24]. The classic risk factors for diabetes are observed in HIV patients. However, obesity is not systematic because mitochondrial dysfunctions make visceral and peripheral adipose tissue particularly resistant to insulin in HIV patients. Even a lipoatrophic patient can develop a metabolic profile comparable to an overweight patient [25].

Diabetes was treated with insulin in 9 cases (50%), OADs in 7 cases (39%) and diet alone in 2 cases (11%). HIV1 viral load was performed in 7 patients on ARV treatment and 5 were undetectable. The vast majority of patients (95%, 16 cases) were in the care circuit and 5% of deaths were recorded. Our data on the control of HIV infection in the context of HIV-diabetes comorbidity are consistent with the literature. In the series by Duncan AD et al, they reported almost constant control of HIV while diabetes was only balanced in less than a quarter of cases [21]. Diabetes is less well controlled in HIV-infected patients than in the general diabetic population (the proportion of patients with a glycated haemoglobin below 6.5% was 22% in our cohort compared with 32.2% of French diabetic subjects in 2007.

Conclusion

HIV and ARV treatment remain important risk factors for diabetes. HIV-diabetes co-morbidity is a reality and one of the pillars of its management is therapeutic education, but emphasis must also be placed on preventive measures and early detection of diabetes in PLHIV.

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