Journal of Advances in Microbiology

22(10): 25-30, 2022; Article no.JAMB.90156
ISSN: 2456-7116

Carriage of HBs Antigen and Hepatitis C Virus in Human Immunodeficiency Virus (HIV) Positive People at the Grand-Yoff General Hospital in Dakar, Senegal

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMB/2022/v22i1030501

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/90156

Original Research Article

Received 05 June 2022
Accepted 09 August 2022
Published 12 August 2022

ABSTRACT

Objective: To investigate the carriage of HBs antigen (Ag) and hepatitis C virus in people with human immunodeficiency virus (HIV) at Grand-Yoff General Hospital.
Materials and Methods: Sera from patients living with HIV and monitored at Grand-Yoff General Hospital have benefited from research for HBs Ag, HBe Ag, anti-H[8] Be antibodies and on these co-infected patients, a test for hepatitis C virus was also carried out.
Results: This study included 147 HIV-infected patients and including 95 women (64.63%) and 52 men (35, 37%) with a median age of 46 years (16-78 years). The gender ratio is M/W was 0.54 and the age group most represented at inclusion was 30-39 years old with 31.97% of patients. 12, 25% of patients were co-infected HIV and hepatitis B including 11 women (61.11%) and 7 men (38.89%). The median age was 39.5 years (33-60 years), women were the affected by co-infection and 44.44% of them were married. Chronic hepatitis B and hepatitis C markers were tested for in

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HIV/HBV coinfected patients using a microparticulate chemiluminescence immunoassay technic. Investigation of hepatitis B chronicity markers indicated that all patient, except one, underwent anti-HBe seroconversion (94.4%) and no case of co-infection with HCV had been noted. During follow-up, all patients were under antiretroviral therapy with mainly tenofovir (TDF) which was the most used molecule with 83.33%, followed by lamivudine (3TC) 16.67%.
Conclusion: HIV infection is a major public health problem when it is associated with hepatitis B and C virus.

Keywords: Co-infection; hepatitis; HIV; HCV.

1. INTRODUCTION

HIV infection remains a major public health problem with 36.9 million people infected worldwide, 25.7 million of them live in the African region [1]. Sharing transmission routes with hepatitis B and C viruses, co-infections with these viruses have become real factors of comorbidity and mortality [2]. Hepatitis B virus (HBV) and hepatitis C virus (HCV) are the two most dangerous liver viruses as they become chronic lifelong diseases in most people. Hepatitis B is the leading cause of acute and chronic liver disease in the world with 257 million people living with the virus [1]. The prevalence of hepatitis B surface antigen (HBsAg) carriage varies widely by geographical areas. Sub-Saharan Africa and Western Pacific regions are more affected with 6.1% and 6.2% of the adult population infected respectively [1]. For hepatitis C virus, approximately 2.3 million people (6.2%) are co-infected with HCV worldwide including 2.4% among people living with HIV.

In Senegal, 85% of the general population have at least one HBV marker [3,4] and the prevalence of HBsAg assessed in several population groups of interest ranged from 7.35% in blood donors to 14% in prisoners [5].

HIV/HBV co-infection as well as HIV/HCV co-infection are very frequent in the world and Africa remains the most affected continent. In Senegal, there is little data on the prevalence of these co-infections. Hospital studies have shown HBV prevalence among people living with HIV (PLHIV) to be 16.8% [6] and 16, 98% [7]. However, no data on HIV/HCV co-infection is available.

It is in this perspective that we were interested in the HIV/HBV/HCV morbid association by studying the prevalence of HBsAg and hepatitis C virus carriage among PLHIV in the active file of the Grand-Yoff General Hospital.

2. MATERIALS AND METHODS

2.1 Type and Period of Study

This was a retrospective study of 147 HIV-infected patients followed at Grand-Yoff General Hospital during the period July to December 2017.

2.2 Study Population

Our study involved all HIV-infected patients who came for consultation during the study period at the Grand Yoff General Hospital and who met the inclusion criteria.

2.3 Inclusion and Exclusion Criteria

All patients living with HIV were included in the study, excluding those lost to follow-up or with incomplete medical records. Persons lost to follow-up and incomplete files were excluded from the study.

2.4 Methodology

A blood sample on EDTA tube was taken from each patient enrolled during the study period (July-December) outside the clinical state. After centrifugation, HIV 1/2 antibodies were tested using a chromatographic screening test (Determine® HIV 1/2 rapid test) and a confirmatory discriminatory test (*ImmunoComb® II HIV 1 & 2 Bispot*). HBsAg testing was performed using a rapid immunochromatographic test (ABON® HBs-Ag; Alere, USA). For the determination of hepatitis B markers and anti-HCV antibodies, the Architect automated immunoassay platform was used to perform immunoassays using microparticle chemiluminescence assay technology.

2.5 Data Analysis

The data were collected on consultation forms. Data entry was performed using Microsoft Office Access (version 2007) database management

software. Sociodemographic, clinical and biological data were collected. Statistical analysis was performed using Excel 2016.

3. RESULTS

3.1 Socio-demographic Characteristics of the Active file

The characteristics of our study population are resumed in Table 1. A total of 147 patients were included with a gender ratio M/W of 0.54 and a median age of 46 years. The majority of the HIV-infected patients were married (n=73; 49.66%). Regarding the age groups most affected by HIV infection, those aged 30-39 and 40-49 were more representative with prevalences of 31.97% (n=47) and 29.93% (n=44) respectively (Table 2).

3.2 Characteristics of HIV/HBV and HIV/HCV Co-infected Patients

Hepatitis B surface antigen (HBsAg) was found in 12.25% (n=18) of the patients living with HIV who were predominantly female (n=11; 61.11%) with a gender ratio of 0.63 M/W. Their median age was 39.5 years (33-60 years). None of patients living with HIV was infected with HCV.

3.3 Treatment Regimen

All patients were on antiretroviral treatment. The most commonly used treatment was the combination Tenofovir+Lamivudine+Efavirenz (77.77%; n=14), followed by the combination Zidovudine+Lamivudine+Efavirenz or Nevirapine with 11.11% (n=3). Only one patient (5.56%) is on second line treatment with Tenofovir+ Lamivudine+ Lopinavir/ Ritonavir (Fig. 1). For treatment against hepatitis B virus, Tenofovir (TDF) remains the most used molecule with 83.33%, followed by Lamivudine (AZT) 16.67%. Concerning the occurrence of opportunistic infections 16.67% presented opportunistic infections such as gastroenteritis (n=1), tuberculosis (n=2).

Table 1. Socio-demographic characteristics of patients living with HIV in the active file

Number of patients	Number	Percentage
	147	100
Gender		
Male	52	35.37
Female	95	64.63
Median age at diagnosis [Extreme]	41 ans [6 – 75 years]	*
Current median age [Extreme]	46 ans [16 – 78 years]	*
Residence		
Senegal	130	88.44
Foreigner	12	8.16
Not specified	5	3.40
Marital status		
Single	12	8.17
Divorced	9	6.12
Married	73	49.66
Widow (er)	14	9.52
Not specified	39	26.53
Age groups (years)		
< 20	2	1.36
20-29	12	8.16
30-39	47	31.97
40-49	44	29.93
50-59	25	17.01
60-69	13	8.85
>70	4	2.72
Total	147	100

Table 2. Main socio-demographic characteristics of co-infected active file

HIV/HBV co-infected active file	Number	Percentage
	18 (12.25%)	100
Gender		
Male	7	38.89
Female	11	61.11
Median age at diagnosis VHB [Extreme]	39 years [30 – 55 years]	
Current median age [Extreme]	39.5 years [33 – 60 years]	*
Marital status		
Singles	5	27.78
Maried	8	44.44
Divorced	2	11.11
Widow (er)	1	5.56
Not specified	2	11.11
Age groups at inclusion		
<30	1	5.6
30-50	16	88.9
>50	1	5.6
Total	18	100
HIV/HCV co-infection	0	0

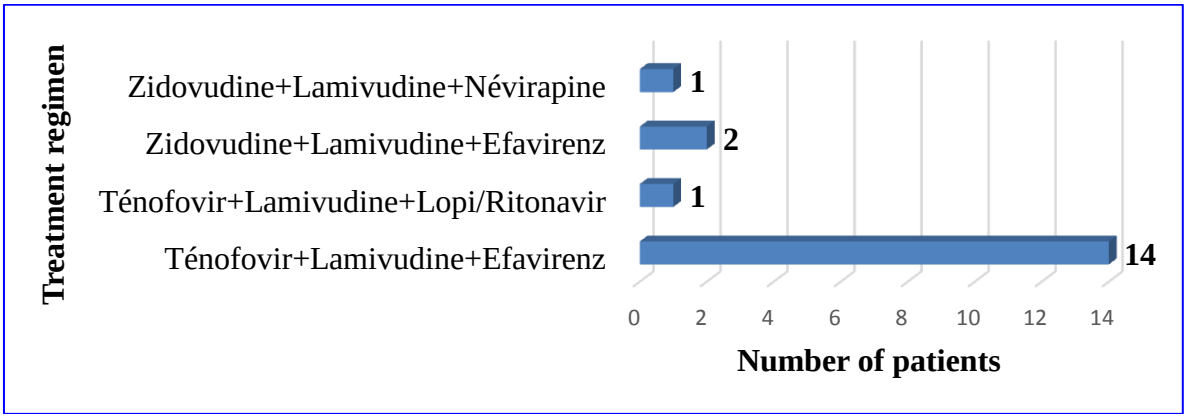

Fig. 1. Antiretroviral treatment regimen for co-infected HIV/HBV patients

4. DISCUSSION

This study allowed us to estimate the prevalence of HIV/HBV, HIV/HCV and HIV/HBV/HCV co-infection in the active file at the Grand-Yoff General Hospital.

Our study still showed the female preponderance of HIV infection (64.63%) as demonstrated in other studies notably in Nigeria (65.2%) [8], Ethiopia (69.5%,) [9] and Ghana (71%) [10].

This female predominance was also found among HIV/HBV co-infected patients (61%). Similar results were found in Burkina Faso, Nigeria and Ethiopia. In contrast, a Nigerian study reported a predominance of HIV-HBV co-infection in men [11]. The median age at diagnosis of the active file in our study population was 41 years with extremes of 6 and 75 years and that of the HIV/HBV co-infected active file was 39 years with extremes of 33 and 60 years. Wondimeneh in Ethiopia [9] and Jacquet in Senegal [5] respectively found median ages of 32 and 30 years, lower than ours for patients living with HIV. Concerning co-infected patients, a study carried out in Burkina Faso showed a median age of 38 years [12].

HBsAg carriage among PLHIV was 12.25% (n=18). Similar results have been observed previously in Dakar [6] but also in other countries such as Benin [13] and Ghana [14] and results were respectively 16.8%, 16.9% and 16.7% higher than ours. On the other hand, a Botswana study conducted in 2011 reported a prevalence of co-infection of 5.3% [15].

In our study, no HIV/HBV/HCV co-infection was observed.

For the treatment regimen world health organization (WHO) recommends a regimen containing Tenofovir (TDF) and Lamivudine (3TC) or Emtricitabine (FTC). Tenofovir+ Lamivudine+ Efavirenz was the most used combination with 77.77%. The remaining 17% did not receive the combination recommended by the WHO, they were on treatment with only one antiviral (lamivudine) which was also active against both viruses. The others had their treatment adapted as soon as the presence of HBsAg was discovered. Bado in 2013 in Burkina Faso found that 68.5% of patients were on a single drug regimen which was either lamivudine or emtricitabine with 30.7% of patients not on treatment [12]. This disparity is due to the fact that in most ARV protocols in Sub-Saharan african countries, lamivudine is the only active drug available against HBV. Matthews G in 2006 showed that after four (4) years of triple ARV therapy with a single drug active against HBV such as Lamivudine, 94% had resistance to the molecule [16]. These results, which differ from ours, can be explained by the fact that in Senegal, since 2006, Tenofovir, Lamivudine and Emtricitabine are part of the treatment of any patient co-infected with HIV-HBV in accordance with WHO recommendations [17].

5. LIMITATIONS OF OUR STUDY

The diagnosis of HBV infection was made by testing for HBsAg. This method carries a risk of minimising prevalence because of the occult hepatitis B increasingly encountered in patients living with HIV. Detection of HBV viral load or PCR would have been the best options to take into account occult hepatitis B.

6. CONCLUSION

In Senegal, co-infection with the hepatitis B virus among people living with HIV is not an uncommon phenomenon, since 12.25% of patients in our study were infected. However, no co-infection with HCV was observed. Thus, the systematisation of HBV and HCV screening should allow for the adaptation of therapeutic regimens, especially in populations at risk.

CONSENT AND ETHICAL APROVAL

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

ACKNOWLEDGEMENTS

Medical biology laboratory of the Idrissa Pouye General Hospital in Grand-Yoff. Emergency department of the Idrissa Pouye General Hospital in Grand-Yoff.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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