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Morbidity and Mortality in Patients Coinfected with Human Immunodeficiency Virus and Hepatitis B Virus

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ABSTRACT

Introduction: *Coinfection with Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) is a global public health problem, particularly in high-endemicity regions like sub-Saharan Africa. This coinfection is associated with an accelerated progression of liver disease and a worse prognosis.*

Objective: *To evaluate morbidity and mortality in patients treated at Hospital Américo Boavida in Angola with HIV/HBV coinfection (2010-2012).*

Methods: *A retrospective descriptive study was conducted in the Infectious and Parasitic Diseases Service (SDIP) of Hospital Américo Boavida between 2010 and 2012. Out of a total of 2397 hospitalized patients, 237 (9.9 %) with confirmed positive serology for both viruses constituted the sample. Sociodemographic, clinical, laboratory, and treatment data were collected from medical records.*

Results: *The coinfection prevalence was 9.9 %. The median age was 26-35 years (38 %), with a predominance of females (62 %). The most common risk factor was heterosexuality (40.1 %). Most patients presented with WHO clinical stage IV (42.2 %) with CD4 counts <200 cells/mm³ (28.3 %). Tuberculosis was the most frequent opportunistic infection (35 %). The most used antiretroviral regimen was AZT+3TC+NVP (21.6 %). The in-hospital mortality rate was 33.8 %.*

Conclusion: *HIV/HBV coinfection represents a significant proportion of hospital admissions in this context. The high mortality observed underscores late presentation, the high frequency of severe immunosuppression and tuberculosis, and limitations in the complete diagnosis of HBV. Strategies for early diagnosis and comprehensive management of this population are needed.*

Keywords: *Coinfection, HIV, Hepatitis B Virus, Morbidity, Mortality, Angola, Sub-Saharan Africa*

1. Introduction

The pandemic of the Human Immunodeficiency Virus (HIV) and the endemicity of the Hepatitis B Virus (HBV) represent two of the most significant challenges for global public health. It is estimated that 39.5 million people were living with HIV in 2022, with the highest burden in sub-Saharan Africa [1]. In parallel, approximately 2 billion people have been infected with HBV globally, of which 400 million are chronic carriers, most residing in regions of Africa and Asia [2,3].

Angola is classified as a high-endemicity region for HBV, with an estimated prevalence between 6 % and 20 % in the general population [4]. Coinfection with HIV and HBV is frequent due to their shared modes of transmission, primarily sexual and parenteral routes. The prevalence of HIV/HBV coinfection is significantly higher in people living with HIV (PLWH) compared to the general population [5,6].

The interaction between both viruses carries serious clinical implications. HIV accelerates the progression of liver disease caused by HBV, increasing the risk of cirrhosis, hepatic decompensation, and hepatocellular carcinoma [7,8]. In turn, chronic hepatitis caused by HBV can influence the selection of the antiretroviral therapy (ART) regimen and is associated with a higher incidence of drug-related liver toxicity [9]. Despite this adverse clinical synergy, there is limited data on the characteristics and outcomes of coinfected patients in Angola. This study aimed to evaluate morbidity and mortality in hospitalized patients with HIV/HBV coinfection in the Infectious and Parasitic Diseases Service of Hospital Américo Boavida between 2010 and 2012.

2. Methods

2.1. Study Design and Setting

A retrospective descriptive study was conducted in the SDIP of Hospital Américo Boavida, a national reference center in Luanda, Angola. The service has 44 beds, subdivided into areas for patients with and without tuberculosis, a miscellaneous ward, and an observation room for severe cases.

2.2. Study Population

The study population included all patients admitted to the SDIP between January 2010 and December 2012. These were patients with confirmed positive serology for HIV (using rapid tests) and for HBV (HBsAg positive) during that period (N=237).

2.3. Data Collection and Processing

Data were obtained by reviewing medical records using a standardized collection form. The collected variables included:

- **Sociodemographic:** Age, sex, educational level, place of origin, marital status.
- **Clinical and Laboratory:** Epidemiological risk factors, HIV diagnostic method, CD4+ lymphocyte count, World Health Organization (WHO) clinical stage for HIV, present opportunistic infections, HBV serological markers (HBsAg, HBeAg, Anti-HBe).
- **Therapeutic:** Instituted ART regimen.
- **Outcome:** Discharge status (improved, deceased, abandonment).

Data were processed and analyzed using SPSS software version 31. Results are presented as frequencies and percentages for categorical variables.

2.4. Ethical Considerations

The study was approved by the Hospital's Clinical Directorate and the Department of Internal Medicine Research of Agostinho Neto University. Patient data confidentiality was guaranteed, using only identification numbers on the collection forms. The information was used exclusively for academic purposes.

3. Results

3.1. Prevalence and Sociodemographic Characteristics

During the study period, 2397 patients were admitted to the SDIP, of whom 237 (9.9 %) were diagnosed with HIV/HBV coinfection and constituted the study population. These results are shown in Table 1.

Table 1. Serology for HBV in hospitalized patients in the SDIP (2010-2012).

Serology for HBV	N (%)
HBsAg positive (+)	237 (9.9 %)
HBsAg negative (-)	1610 (67.2 %)
No result	550 (22.9 %)
Total	2397 (100 %)

The sociodemographic variables that were considered provided a general idea of the investigated population. The obtained data are shown in Table 2.

Table 2. Sociodemographic characteristics of coinfected patients.

Age Group	Sex				Educational Level										Marital Status										Total	
	Male		Female		Primary cycle		Secondary cycle		Medium level		University		Illiterate		Single		Divorced		Common-law		Widowed		Married			
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15-25	9	22.5	31	77.5	25	62.5	10	25.0	5	12.5	0	0	0	0	30	75.0	5	12.5	5	12.5	0	0	0	0	40	16.9
26-35	36	40.0	54	60.0	35	38.9	20	22.2	15	16.7	10	11.1	10	11.1	40	44.4	15	16.7	15	16.7	10	11.1	10	11.1	90	38.0
36-45	22	36.7	38	63.3	20	33.3	15	25.0	10	16.7	10	16.7	5	8.3	20	33.3	10	16.7	10	16.7	10	16.7	10	16.7	60	25.3
46-55	14	51.9	13	48.1	5	18.5	5	18.5	5	18.5	2	7.4	10	37.0	5	18.5	5	18.5	5	18.5	10	37.0	2	7.4	27	11.4
≥ 56	9	45.0	11	55.0	5	25.0	0	0	0	0	0	0	15	75.0	5	25.0	5	25.0	3	15.0	6	30.0	1	5.0	20	8.4
Total	90	38.0	147	62.0	90	38.0	50	21.1	35	14.8	22	9.3	40	16.9	100	42.2	40	16.9	38	16.0	36	15.2	23	9.7	237	100.0

The age distribution showed that the 26-35 years group was the most affected (90 patients, 38 %), followed by the 36-45 years group (60 patients, 25.3 %). 62 % (147) of the patients were women. Most had a low educational level (primary cycle, 38 %) and were single (42.2 %). It is worth mentioning that 70 of the studied patients were from Luanda, accounting for 29.5 %.

3.2. Diagnosis, Immunosuppression, and Risk Factors

HIV diagnosis was made in 100% of cases using a combination of two rapid tests (Determine and Unigold). No patient had access to viral load tests. Regarding CD4+ count, 28.3 % (67/237) had <200 cells/mm³. It is noteworthy that 38 % (90) of the patients did not have this test recorded, as shown in Table 3.

Table 3. CD4+ lymphocyte count in coinfected patients.

Flow Cytometry (CD4+)	N	%
<200 cells/mm³	67	28.3
200-350 cells/mm³	30	12.7
351-500 cells/mm³	25	10.5
>500 cells/mm³	25	10.5
Not performed	90	38.0
Total	237	100.0

The predominant epidemiological risk factor was heterosexuality with 95 patients (40.1 %). Other transmission routes were found, among which the use of sharp objects (14.8 %) and blood transfusion (14.3 %) predominated.

3.3. Clinical Staging, Opportunistic Infections, and Treatment

Most patients presented with advanced stages of HIV disease: 42.2 % (100) in stage IV and 25.3 % (60) in WHO stage III. Tuberculosis was the most frequent opportunistic infection (83 cases, 35 %), followed by meningitis (10.5 %) and oropharyngeal candidiasis (10.1 %).

Regarding ART, 42 % (100) started treatment for the first time during hospitalization, while 35 % (83) did not receive ART. The most used regimens were Lamivudine/Nevirapine/Zidovudine (AZT+3TC+NVP), Stavudine/Nevirapine/Efavirenz (D4T30+3TC+EFV) and Stavudine/Lamivudine/Nevirapine (D4T30+3TC+NVP) with 21.6% each.

3.4. HBV Markers and Outcome at Discharge

All patients (100 %) were diagnosed with HBV by detecting HBsAg. However, the evaluation of other viral markers (HBeAg, Anti-HBe, HBV DNA) was extremely rare (only 1 case, 0.4% for each), which limits the characterization of the hepatitis B phase. At discharge, 57.8 % (137) of the patients improved, but a high in-hospital mortality rate of 33.8 % (80 patients) was recorded. 8.4 % (20) left the hospital against medical advice.

Discussion

This study describes the characteristics and outcomes of a cohort of hospitalized patients with HIV/HBV coinfection in an Angolan reference hospital. The coinfection prevalence of 9.9 % is consistent with previous studies, which found prevalences around 9 % [10, 11]. This confirms the high endemicity of HBV among PLWH in the region.

The sociodemographic profile showed a predominance of young adults (26-35 years) and women, reflecting the general epidemiology of HIV in Angola, where women represent a significant proportion of cases [12]. The low educational levels observed are a known risk factor for acquiring STIs, associated with less access to information on prevention and health measures [13].

The clinical presentation was notably late, with most patients in WHO stage IV and with profound degrees of immunosuppression (CD4+ <200 cells/mm³ in 28.3 % of cases with available testing). This suggests significant barriers in access to early HIV diagnosis and care, leading to hospital admissions for advanced opportunistic diseases. Tuberculosis, the main opportunistic infection (35 %), is endemic in Angola, and its management in coinfected patients is complex due to drug interactions and the risk of developing immune reconstitution inflammatory syndrome (IRIS) [14].

The most critical limitation identified is the near absence of complete HBV serological evaluation beyond HBsAg. The determination of HBeAg, Anti-HBe, and crucially, HBV viral load (HBV DNA) is essential to define the viral replication phase, indicate specific treatment for hepatitis B, and monitor therapeutic response [15]. The lack of these diagnostic resources prevents optimal management according to international guidelines.

The high in-hospital mortality (33.8 %) can be attributed to this combination of late presentation, severe immunosuppression, high frequency of tuberculosis, and probable liver disease that was not characterized or treated adequately. Previous studies have confirmed that HIV/HBV coinfection doubles the risk of liver-related mortality compared to HIV monoinfection [16].

Study Limitations

Those inherent to its retrospective design, such as dependence on the quality and completeness of clinical records. The lack of data on HBV markers and HIV viral load limits the in-depth analysis of factors associated with outcomes. The sample comes from a single hospital center, which may limit the generalization of the results.

Having analyzed these results, it is pertinent to point out the need to strengthen strategies for early HIV diagnosis to avoid late presentations. It would be necessary to implement complete HBV serological evaluation (HBeAg, Anti-HBe, HBV DNA) as a routine part of the management of PLWH; establish specific clinical protocols for the management of coinfection, including the selection of ART regimens with dual activity against both viruses; and conduct prospective studies to better determine the real burden of liver disease and prognostic factors in this population.

Conclusion

This study found a high prevalence (9.9 %) of HIV/HBV coinfection among hospitalized patients in an infectious diseases service in Angola. Patients were characterized by presenting in advanced

stages of HIV disease, with a high prevalence of tuberculosis and significant in-hospital mortality. The main limitation identified was the incomplete evaluation of hepatitis B, which underscores the gaps in the comprehensive management of these patients.

Conflict of Interest and Funding

The The author declares no conflict of interest and received no specific funding for this work.

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