

Management of Viral Hepatitis B in A Regional Hospital Center of Senegal

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Abstract

Introduction: Viral hepatitis B represents a major public health concern in Senegal. The objective of this study was to assess its management in a hospital center in Senegal located 70 km from the capital. **Patients and Methods:** This retrospective, longitudinal, and descriptive study was conducted from August 1, 2018 to July 31, 2021, in the Internal Medicine Department of the Regional Hospital Center of Thiès. Using hospitalization and consultation records, we included all patients diagnosed with viral hepatitis B confirmed by positive HBsAg. Collected data included epidemiological, clinical, paraclinical, therapeutic, and outcome variables. Data analysis was performed with the SPSS software, version 26.0. **Results:** A total of 138 patients were included: 119 with chronic viral hepatitis B, 10 with cirrhosis, and 9 with liver cancer. There were 77 women (55.8%). The mean age was 35 years (range: 17 - 70 years). The average diagnostic delay was 51.6 months. Family history of HCC or cirrhosis among first-degree relatives was present in 14 patients (10%). Diagnosis followed screening in 57 patients (80.3%) and blood donation in 11 patients (15.5%). Physical examination was normal in 76.1% of cases. Viral load was detectable in 88.9% of cases, with a mean level of 5,347,256.4 IU/ml. HBeAg was positive in 3 cases (6.6%). Significant fibrosis was identified in 6 patients (11.76%). The serological profile among patients with chronic hepatitis was assessed in 22 cases (18.5%). HBeAg-negative hepatitis was observed in 59% of these cases. Tenofovir disoproxil fumarate (TDF) was prescribed to 29 patients, with a complete virological response achieved in 5 cases. **Conclusion:** Significant progress has been achieved in the management of viral hepatitis B in Senegal. Nevertheless, our study demonstrates that further efforts are required to improve access to technical facilities and the standardization of clin-

ical practices.

Keywords

Viral Hepatitis B, Liver Cirrhosis, Liver Cancer, Thiès

1. Introduction

Hepatitis B virus (HBV) infection represents a significant public health issue. The number of chronic HBV carriers is estimated at approximately 296 million, with 81 million residing in Africa [1]. Senegal is considered a country with high endemicity, displaying a seroprevalence rate estimated at 8.2% [2]. HBV infection causes acute hepatitis, which may advance to chronic hepatitis and its complications (cirrhosis and hepatocellular carcinoma (HCC)), underscoring the disease's severity. In developing countries, management of hepatitis B remains challenging, facing numerous socio-economic obstacles [3]. In Senegal, most of the population lacks medical coverage. Furthermore, diagnostic and pre-therapeutic facilities are especially inadequate in regions outside the capital (Dakar). It is also important to note that management is generally based on guidelines from Northern countries. The majority of studies conducted on this subject have been performed in Dakar, where most hepato-gastroenterologists are based. The aim of this study was to evaluate the management of this condition at a Hospital Center in the Thiès region, located 70 km from the capital. The specific objectives were to describe the epidemiological, clinical, paraclinical, therapeutic, and prognostic features of patients with hepatitis B infection.

2. Patients and Method

We carried out a retrospective, longitudinal, descriptive study from 1st August 2018 to 31 July 2021 (36 months) in the Department of Internal Medicine at the Regional Hospital Center of Thiès. The study population comprised all patients followed as outpatients or hospitalized in the department. Using hospitalization and consultation records, we included all patients with hepatitis B viral infection and positive HBsAg. Patients whose records could not be located were excluded. Relevant epidemiological, clinical, paraclinical, therapeutic, and outcome data were collected from medical records and documented on a data collection form. Data entry was performed using Excel 2016, and the analysis was conducted with SPSS version 26.0. Missing values were handled using pairwise deletion, with each analysis using all available data for the variables involved

- The diagnosis of acute viral hepatitis B was established based on:
 - transaminases >10 N (N = upper limit of normal)
 - the HBsAg positive and the presence of anti-HBc IgM antibodies
- The diagnosis of chronic viral hepatitis B was established based on the presence of HBsAg for more than 6 months.

- The diagnosis of cirrhosis was made in the presence of:
 - a body of arguments
 - ✓ Clinical: hepatomegaly cirrhotic, a hepatic atrophy, signs of portal hypertension, signs of hepato-cellular insufficiency.
 - ✓ Paraclinical investigations: biology (cytolysis, cholestasis, hepato-cellular insufficiency, beta-gamma block on serum protein electrophoresis), abdominal ultrasound/abdominal CT scan (hepatic dysmorphia, signs of portal hypertension), esophagogastroduodenoscopy (signs of portal hypertension), non-invasive fibrosis markers: F4 score.
 - Or a score Metavir F4 on histology
- Liver cancer was considered based on:
 - Radiological criteria: an hypervascularization in the arterial phase (wash-in) associated with a wash-out in the portal phase (wash-out) on a cirrhotic liver.
 - Histological criteria
- Severe fibrosis is defined by:
 - APRI score > 2
 - FIB4 score > 2.67
 - Fibroscan: median elasticity > 9 kPa
- Complete virological response defined as an undetectable HBV viral load by polymerase chain reaction (PCR) (detection limit: 26 IU/ml, threshold in French laboratories) after at least 12 months of treatment.
- Partial virological response corresponds to a decrease in HBV DNA of more than 1 log₁₀ IU/ml, but remaining detectable after at least 12 months of treatment, in a compliant patient.

3. Ethical Considerations

Our study was retrospective and descriptive, based exclusively on the use of existing medical records. It did not pose any additional risk to patients and did not involve the collection of new paraclinical data. The data were collected in strict compliance with medical confidentiality and kept confidential.

4. Results

During the study period, we collected data from 138 patients carrying the hepatitis B virus, corresponding to 138 medical records. The cohort consisted of 119 patients with chronic hepatitis B, 10 with cirrhosis, and 9 with liver cancer. No cases of acute hepatitis were identified. The mean patient age was 35 years (range: 17 - 70 years; standard deviation of 10.6), with a standard deviation of 10.6. Fifty-seven patients were between 30 and 39 years of age (41.3%). A total of 77 women were included (55.8%), with a sex ratio of 0.79. The diagnostic delay for hepatitis B virus infection was specified in 16 patients (11.59%), with a mean duration of 51.6 months [range: 12 - 144 months]. A family history of liver disease was reported in 19 patients (13.8%), including 14 among first-degree relatives. This comprised 10 cases of HCC, 8 cases of chronic hepatitis B, and 1 case of cirrhosis. Active smok-

ing was observed in 3 patients (2.3%), and occasional alcohol consumption was reported in 2 patients (1.4%). Oral herbal therapy was identified in 38 patients (27.5%). The circumstances of diagnosis were specified in 76 patients (55.1%). Diagnosis was made during screening in 60 cases (78.9%) and during blood donation in 11 cases (14.5%). Physical examination was normal in 105 patients (76.1%), comprising 99 with chronic hepatitis, 4 with cirrhosis, and 2 with liver cancer. Tumoral hepatomegaly was observed in 2 patients with liver cancer. The socio-demographic and clinical characteristics of the patients are presented in **Table 1**.

Table 1. Sociodemographic and clinical characteristics of patients according to the clinical form.

	Chronic hepatitis	Cirrhosis	Liver cancer	Total population
Age: average [extremes] (years)	35 [17 - 70]	39 [20 - 65]	36 [20 - 62]	35 [17 - 70]
Sex: women n (%)	73 (61.3)	3 (30)	1 (11.1)	77 (55.8)
Circumstances of discovery n/N (%)				
Screening	57/71 (80.3)	1/1 (100)	2/4 (50)	60/76 (78.9)
Pregnancy check-up	36/57 (63.2)	0 (0)	0 (0)	36/60 (60)
Systematic screening	21/57 (36.8)	1/1(100)	2/2 (100)	24(40)
Blood donation	11/71(15.5)	0 (0)	0(0)	11/76 (14.5)
Tumoral hepatomegaly	0 (0)	0 (0)	2/4 (50)	2/76 (2.6)
Accidental exposure to blood	1/71 (1.4)	0 (0)	0 (0)	1/76 (1.3)
Abdominal pain	2/71 (2.8)	0 (0)	0 (0)	2/76 (2.6)
Clinical manifestations n/N (%)				
Abdominal pain	27/119 (22.7)	1/10 (10)	8/9 (88.9)	36/138 (26.1)
Dyspepsia	1/119 (0.8)	0 (0)	4/9 (4.4)	5/138 (3.6)
Abdominal heaviness	3/119 (2.5)	0 (0)	0 (0)	3/138 (2.2)
Weight loss	4/119 (3.4)	1/10 (10)	7/9 (77.8)	12/138 (8.7)
Anorexia	4/119 (4.3)	0 (0)	3/9 (33.3)	7/138 (5.1)
Asthenia	8/119 (6.7)	0 (0)	4/9 (44.4)	12/138 (8.7)
Lower limbs Edema	0 (0)	0 (0)	1/9 (11.1)	1/138 (0.7)
Jaundice	0 (0)	0 (0)	1/9 (11.1)	1/138 (0.7)
Hepatomegaly	1/119 (0.8)	1/10 (10)	7/9 (77.8)	9/138 (6.5)
Splenomegaly	0 (0)	1/10 (10)	2/9 (22.2)	3/138 (2.2)
Ascites	0 (0)	1/10 (10)	1/9 (11.1)	2/138 (1.4)

Transaminase levels were assessed in 101 patients (73.2%). The mean alanine aminotransferase (ALT) value was 32.34 IU/l [4.47 - 275.13 IU/l], while the mean aspartate aminotransferase (AST) value was 37.16 IU/l [2.05 - 202.5 IU/l]. Alka-

line phosphatase (ALP) and gamma-glutamyl transferase (GGT) levels were measured in 24 patients (17.39%), with mean values of 133.79 IU/l [6.56 - 483.84 IU/l] and 47.39 IU/l [9.54 - 246.96 IU/l], respectively. Bilirubin levels were measured in 27 patients (19.56%), with a mean value of 12.78 mg/l [1.2 - 131.87 mg/l]. Prothrombin levels were assessed in 45 patients (32.6%), ranging from 29% to 100% with a mean of 91.11%. Albumin levels were measured in 16 patients (11.6%), with a mean of 43.52 g/l [32.83 - 77 g/l].

The viral load was measured in 99 patients (71.74%). It was detectable in 88 cases (88.89%) with an average rate of 5,347,256.4 IU/ml [13 and 332,000,000 IU/ml]. The biological abnormalities found in the patients are shown in **Table 2**.

Table 2. Biological anomalies according to the clinical form

	Chronic hepatitis	Cirrhosis	Liver cancer
ALAT > normal (n)	6	3	3
ASAT > normal (n)	12	3	5
PAL > normal (n)	1	0	3
GGT > normal (n)	1	3	0
Direct-predominant hyperbilirubinemia (n)	4	0	1
Lowered BP (n)	3	2	0
Hypoalbuminemia (n)	1	0 (0)	1
Undetectable viral DNA n/N (%)	10/87 (11.5)	1/10 (10)	0/2 (0)
Detectable viral DNA			
Average rate [extremes] (UI/mL)	4,687,436.97 [13 - 332,000,000]	12,131,726.19 [210 - 104,599,006]	1793 and 438 593
<2000 n/N (%)	45/87 (51,7)	2/10 (20)	1/2 (50)
2000 - 20,000 n/N (%)	20/87 (23)	4 /10(40)	0 (0)
>20,000 n/N (%)	12/87 (13.8)	3/10 (30)	1/2 (50)

The serological status AgHBe/anti-HBe Ab was determined in 45 patients (32.61%).

HBeAg was positive in 3 patients with chronic hepatitis (6.6%).

The serologies for the human immunodeficiency virus (HIV), for hepatitis D virus (HDV) and for hepatitis C virus (HCV) were performed respectively in 42 (30.4%), 67 (48.5%), and 52 patients (37.7%). They were negative.

The level of alpha-fetoprotein was measured in 46 patients (33.3%). A level greater than 400 IU/ml was found in 4 patients with liver cancer.

Abdominal ultrasound performed in 80 patients (57.97%), found abnormalities in 18 patients (22.5%) (**Table 3**).

Table 3. Distribution of patients according to the results of abdominal ultrasound and the clinical form.

	Chronic hepatitis n/N (%)	Cirrhosis n/N (%)	Liver cancer n/N (%)
Liver			
Hepatomegaly	1/5 (20)	1/5 (20)	5/8 (62,5)
Dysmorphia	0/5 (0)	1/5 (20)	0 (0)
Irregular contours	0/5 (0)	1/5 (10)	3/8 (37,5)
Granular echostructure	1/5 (20)	0/5 (0)	0/8 (0)
Tumor	0/5 (0)	0/5 (0)	4/8 (50)
Splenomegaly	0/5 (0)	1/5 (20)	2/8 (25)
Splenic vein dilation	0/5 (0)	0/5 (0)	1/8 (12,5)
Portal vein dilation	0/5 (0)	1/5 (20)	0 (0)
Collateral veins	0/5 (0)	1/5 (20)	0 (0)
Ascites	0/5 (0)	3/5 (60)	3/8 (37,5)
Reversal of the portal flow	0/5 (0)	1/5 (20)	0 (0)
Laminated portal vein	0/5 (0)	0/5 (0)	1 (12,5)
Portal thrombosis	0/5 (0)	0/5 (0)	1 (12,5)

The abdominal scan, was performed in 10 patients (7.25%), and identified abnormalities in 7 patients diagnosed with liver cancer. The principal findings included: hepatomegaly (5 cases) with irregular margins (1 case), dysmorphia (1 case), and a tumor (5 cases) exhibiting a wash-in *pattern followed by* a wash-out (4 cases). Signs of portal hypertension (6 cases) and portal vein thrombosis (4 cases) were also observed.

The main lesions found during esophagogastroduodenal endoscopy were signs of portal hypertension (3 patients), gastritis (3 patients), and bulbitis (3 patients).

Liver fibrosis was assessed in 72 patients (52.17%). This assessment was conducted primarily using the Fibroscan performed in 51 patients (36.95%), which identified severe fibrosis in 6 patients, including 4 at the cirrhosis stage. The APRI score calculated for 19 patients revealed severe fibrosis in 1 instance, while the FIB-4 score identified severe fibrosis in 1 case among 19 patients. A Fibrotest Actitest was conducted in 1 patient with chronic hepatitis, resulting in a score of A0F0.

According to the classification of the “European Association for the Study of the Liver” (EASL) 2017, the serological profile of patients with chronic hepatitis could be determined in 22 patients (18.5%) (Table 4).

Antiviral therapy was initiated in 29 patients. The indications included chronic hepatitis B in 16 cases, cirrhosis in 6 cases, prevention of mother-to-child transmission in 1 case, and off-guideline use in 6 cases. The drug administered was tenofovir (TDF), at a dosage of 300 mg per day, taken orally as a single dose. After

Table 4. Serological profile of patients with chronic hepatitis.

	HBeAg positive chronic infection	HBeAg positive chronic hepatitis	HBeAg negative chronic infection	HBeAg negative chronic hepatitis
n (%)	0 (0)	3 (13.6)	6 (27.3)	13 (59.1)
Average ALAT level (x N*)	-	2.25	0.51	0.60
Viral DNA B (UI/mL)				
Average rate	-	112,759,777	3833	1,359,335.17
<2000 (n)	-	1	3	5
2000 - 20,000 (n)	-	0	3	4
>20,000 (n)	-	2	0	4
Fibroscan score (n)	-	F2 (3)	F1 (6)	F2 (13)

*N: The normal.

12 months of antiviral treatment, 16 patients were lost to follow-up, and virological evaluation was conducted in 5 patients. A complete virological response was observed in 4 patients, while a partial virological response was noted in 1 patient.

5. Discussion

Our study population consisted predominantly of young adults aged 30 to 39 years (41.3%), with a mean age of 35 years [17 - 70 years]. These findings are similar to those reported in Senegal by Ramirez *et al.* and Diallo *et al.*, as well as in Guinea Conakry by Diallo *et al.* [3]-[5]. In contrast, other studies conducted in Africa, France, and the United States found a higher mean age [6]-[9]. In most sub-Saharan African countries, including Senegal, HBV infection is endemic, with transmission occurring primarily during the perinatal period and early childhood. This accounts for the young age of patients presenting with cirrhosis or liver cancer. The female predominance reported in our study is consistent with findings by Ntagirabiri *et al.* in Burundi [10]. By contrast, most studies have noted a male predominance [3] [6] [9] [11]-[13]. This may be partly explained by the recommendation for HBsAg screening during pregnancy and the routine referral of all HBsAg-positive pregnant women from the gynecology-obstetrics department of Thiès regional hospital to the Internal Medicine department. A family history of cirrhosis and HCC was identified among first-degree relatives in 1 and 10 cases, respectively. Family history of cirrhosis and HCC is recognized as a risk factor for progression to cirrhosis or HCC and is taken into consideration in therapeutic strategies [14] [15]. Screening of first-degree relatives is an integral component of HBV infection management. It leads to the management of positive cases and vaccination of uninfected individuals.

Oral phytotherapy was observed in 38 patients (40.9%). Tufon *et al.* [16] and Choi *et al.* [14] reported its use in 10.25% and 17% of cases, respectively. In our

region, the absence of medical coverage may partially account for the use of phytotherapy, which is perceived as more accessible. However, such phytotherapy can be hepatotoxic and may result in severe acute hepatitis or in a more rapid progression of the disease.

The disease was detected primarily through screening (78.9% of cases) or blood donation (14.5% of cases). Viral hepatitis B is asymptomatic in most cases. It is most frequently identified incidentally during routine screening, health examinations, or blood donation [3] [5]. Discovery may also occur in the context of complications such as cirrhosis or liver cancer [3].

The serological profile could be determined in only 22 patients (18.5%). This is likely due to the frequent socio-economic challenges encountered. Specifically, the high cost of investigations, combined with the fact that most patients lack health insurance and have modest incomes, limits access to testing. Family solidarity plays an important role, but it does not always provide sustained financial support. In our study, 13 patients (59.1%) exhibited a chronic hepatitis profile with AgHBe (-). This outcome is comparable to findings reported by other authors in Cameroon, Iran, and Brazil [16]-[18].

Twenty-nine (29) patients were treated with a TDF-based antiviral regimen at a dose of 300 mg per day, administered as a single daily dose. International guidelines recommend the use of antivirals with a high resistance barrier [14] [15]. In Senegal, TDF has been available since 2010; it is subsidized, and a box of 30 tablets costs 5000 FCFA. Treatment was prescribed outside of standard recommendations in 6 patients, highlighting the need for national guidelines more closely aligned with local socio-economic conditions. Prevention of mother-to-child transmission (PMTCT) with TDF was implemented in one case. HBsAg screening during pregnancy is essential and should be mandatory. Prenatal consultation accounted for 63.2% of screening indications among patients with chronic hepatitis. In regions of high endemicity, natal and perinatal transmission represent the primary routes of infection spread. Systematic screening should lead to adequate management, including both pregnant women and newborns. The hepatitis B vaccine was incorporated into Senegal's Expanded Programme on Immunization (EPI) in 2005. This vaccine is provided free of charge. However, the cost of seroimmunization is borne by the parents, and it is rarely performed due to its high expense. After 12 months of antiviral therapy, a complete virological response was observed in 4 patients, with a partial virological response in 1 patient. In Senegal, Diallo *et al.* [3] reported good renal tolerance, normal phosphocalcic balance, and undetectable viral load in 34 patients. In Burkina Faso, in a study involving 34 patients on TDF, Bobilwindé *et al.* [19] observed a virological response in 24 patients.

Our study has certain limitations. Its retrospective nature exposes us to biases related to the completeness of the data. The use of paper medical records led to potential loss of documents. Important information (HBeAg/anti-HBe Ab status, HBV viral load or fibrosis tests) was sometimes not available, thus limiting the

assessment of the severity of the disease. Furthermore, the high proportion of patients lost to follow-up limits the assessment of the effectiveness of the treatment and the long-term evolution. However, our work is based on a large sample and covers a sufficiently long period to provide important data on viral hepatitis B in a real clinical practice context.

6. Conclusion

Viral hepatitis B continues to represent a public health issue in Senegal. Significant advancements have been achieved in its management. Nevertheless, the absence of medical coverage and limited technical resources especially in hospital facilities outside the capital pose ongoing challenges for effective care. National recommendations are needed to standardize practices and formalize the patient care pathway.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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