

Prevalence of HBV (Hepatitis B Virus) Serological Markers in Patients admitted to the Bacteriology and Virology Laboratory of the University Hospital of FANN DAKAR, SENEGAL

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ABSTRACT

Objective: Hepatitis B is a liver infection that is widespread throughout the world and constitutes a real public health problem, with 2 billion people infected by the virus worldwide. The aim was to study the prevalence of Hepatitis B virus (HBV) markers in patients received at the Bacteriology-Virology laboratory of CHNU of FANN.

Methodology: This is a retrospective study based on the exploitation of results covering the period from January to November 2020. The markers included in our study were: HBs antigen (HBsAg); anti HBs antibody (anti HBsAb); HBe antigen (HBeAg); anti HBe antibody (anti HBeAb); anti HBc antibody (anti HBcAb). The data were collected from registers, then entered and processed using EPI-INFO software version 3.5.4.

Results: 1,590 patients were seen during the study period for serological markers of hepatitis B virus. The mean age was 41.90 years, with extremes of 2 years and 100 years. Women accounted for 55.98%, giving a sex ratio (M/F) of 1.27. The age group [20-40 years] was the most representative of our study population with a percentage of 47.9%, followed by the age group 40-60 years with a percentage of 23.9%. The prevalence of HBsAg-positive patients was 11.1%, HBeAg-positive patients 9.15%, HBeAb-positive patients 66.1% and HBcAb-positive patients 68.5%; 59.92% of patients had an anti-HBs antibody titre above the protective threshold (greater than 10 IU/L). Seroprevalence was higher in women than in men, with 49.37% in men and 50.63% in women, i.e. a total of 79 men for 81 women.

Keywords

CHNU Fann, Hepatitis B, Serological markers.

Introduction

Hepatitis B is a widespread liver infection caused by the Hepatitis B Virus (HBV). This pathology constitutes a real public health problem, with 2 billion people worldwide infected with the virus. Of these, more than 370 million are chronic carriers (Institut

Pasteur, 2013) and nearly 600,000 people die every year from the acute or chronic consequences of hepatitis B. In Senegal, HBV infection is highly endemic, with 11% of chronic carriers in the general population. The seriousness of chronic hepatitis B lies in the high risk of progression to hepatic fibrosis, followed by cirrhosis and then liver cancer in the absence of treatment. Indeed, HBV is responsible for 30% of cases of cirrhosis and 53% of cases of hepatocellular carcinoma (HCC) [1,2].

It is in this context that we conducted this study, the general aim of which is to determine the different serological profiles obtained in the context of screening and monitoring patients carrying the hepatitis B virus.

Patients and Methods

Patients

The study concerned 1,590 patients received at the bacteriology-virology laboratory of the University Hospital of FANN between January and November 2020 for the detection of serological markers of the hepatitis B virus.

Methods

Data were obtained from the bacteriology-virology laboratory registers, then entered and processed using EPI-INFO software version 3.5.4.

Age, sex, patient history and department of origin were also collected. The markers included in our study were: HBs antigen (HBsAg); anti HBs antibody (anti HBsAb); HBe antigen (HBeAg); anti HBe antibody (anti HBeAb); anti HBc antibody (anti HBcAb). Hepatitis B virus (HBV) markers were assayed using the Architect Abbott automated system (Figure 1), based on a multi-step assay for the detection of antibodies or antigens in human serum using chemiluminescence microparticle immunoassay technology. Marker detection is performed on venous blood samples under rigorous aseptic conditions.



Figure 1: Architect ci4100.

Results

Characteristics of the study population

The study was carried out on 1,590 patients received at the bacteriology-virology laboratory of the University Hospital of FANN between January and November 2020 for hepatitis B virus marker testing. The mean age was 41.90 years, with extremes of 2 years and 100 years. Women accounted for 55.98%, giving a sex ratio (M/F) of 1.27. The age group [20-40 years] was the most representative of our study population, with a percentage of 47.9%, followed by the 40-60 age group with a percentage of 23.9% (Table 1).

Table 1: Distribution of study population by gender, age group and status.

Caracteristics	Effects	Percentage (%)
Sex		
Male	666	55,98
Female	847	44,02
Total	1513	
Classe d'Age (ans)		
<20	82	7,5
[20-40[518	47,9
[40-60[259	23,9
[60-80[211	19,5
>80	11	1,01
Total	1081	
Status		
External	1501	94,5
Internal	89	5,5
Total	1590	

The majority of patients (94.5%) were seen on an outpatient basis (Table 1).

Results of serological markers tested (Table 2):

Our results showed

The prevalence of patients carrying HBs antigen was 11.1%. Anti-HBs antibodies were present in 227 patients (68.5%), 59.92% of whom had a titre above the protection threshold (10 IU/L).

The replication marker (HBeAg) was found in 13 of 142 patients (9.15%), and 66.1% of patients had anti-HBe antibodies.

Table 2: Distribution of study population by marker.

Caractéristiques	Effectifs	%
Ag HBs		
Positif	158	11,1
Négatif	1190	88,9
Total	1338	
Ac antiHBs		
Titre < 10 UI/l	91	40,08
Titre >10 UI/l	136	59,92
Total	227	
Ag HBe		
Positif	13	9,15
Négatif	129	90,8
Total	142	
Ac antiHBe		
Positif	72	66,1
Négatif	37	33,9
Total	109	
Ac antiHBc		
Positif	91	68,5
Négatif	42	31,5
Total	133	

The frequency of anti-HBc antibodies was 68.5% -Seroprevalence by sex (Table 3).

Table 3: Seroprevalence by gender.

Sex	Effect	Percentage
Male	79	49,37
Female	81	50,63
Total	160	

Seroprevalence was higher in women than in men, with 49.37% in men and 50.63% in women, i.e. a total of 79 men for 81 women.

Discussions

Infection with the hepatitis B virus is a public health problem in a country with limited resources such as Senegal, not only because of its frequency, but also because of its high lethality linked to the serious complications it causes, notably cirrhosis and primary liver cancer.

In Senegal, 85% of the general population have been in contact with the hepatitis B virus, and around 11% are chronic carriers. The aim of our study was to assess the prevalence of hepatitis B virus in patients treated at the CHNU de FANN. A total of 1,590 people were included in our study between January and November 2020. We conducted a retrospective descriptive study. Our study population was composed of 44.02% women and 55.98% men. In contrast, a predominantly female study population was found in a Beninese hospital study in 2016, which reported 59.68% women and 40.30% men [3], as well as in a Malian study in 2014 [4].

Our study population has an average age of 41.90 years, different from that found by Bessimbaye et al. in Chad, with a hospital study population in which the average age was 31.3 years [5]. The age group most represented in our study was 20-40 years, with a rate of 47.9%, which is comparable to that of Traoré et al [6], who found a high prevalence in the 25-34 age group, with a rate of 29.7%.

The majority of patients recruited in our study were followed up on an outpatient basis, i.e. 1501 patients, representing a rate of 94.5% of the total number of patients recruited. We found an HBV seroprevalence of 11.1% in a population of 1,590 people of all sexes received at the CHNU FANN bacteriology-virology laboratory, placing our patients in a high-prevalence group according to the World Health Organization classification. It is equal to that found in most populations of interest in Senegal, such as pregnant women, where it varies between 11.57% and 12%. However, it is slightly lower than that of a study in Côte d'Ivoire, which found 15.6% among patients admitted to the Ivorian National Gendarmerie [7].

In our study, the number of HBsAg-positive women was slightly higher than that of men: 81 women (50.63%) and 79 men (49.37%). In the general population, seroprevalence is higher in men than in women [8]. This male predominance was noted by Ott et al. in a worldwide epidemiological review of hepatitis B [8]. It was also found by Lo et al. in people living with HIV [9]. This

male predominance may be linked in part to a genetic factor that protects women against hepatitis B virus infection.

We looked for markers of chronicity in HBsAg-positive subjects, notably HBe antigen, a marker of active viral replication, and anti-HBe antibodies. A total of 90.8% of subjects were HBe antigen-negative and 66.1% had anti-HBe antibodies. The latter are markers of viral replication arrest. Our results differ from those of Lo et al. [9], who found a seroprevalence of 24.4% for HBe antigen and 69.2% for anti-HBe antibodies in people living with HIV who were HBs antigen positive. With regard to anti-HBs antibodies, we were able to divide our study population into two categories: those with an anti-HBs titer of less than 10 IU/l and those with an anti-HBs titer ≥ 10 IU/ml. The anti-HBs threshold of 10 IU/l is considered to be the protective threshold [9].

In our study, out of a total of 227 requests for anti-HBs titration, we found that 91 patients (40.08%) had a titre below 10 IU/l and 136 patients (59.92%) had a titre above 10 IU/l. Those with insufficient anti-HBs titer need to be vaccinated according to World Health Organization recommendations [10]. For subjects with a protective level of anti-HBs antibodies (above 10 IU/l), testing for IgG-type anti-HBc antibodies would have enabled us to distinguish subjects who had developed immunity following resolution of the infection.

Our study involved a mixed male and female population, and all potentially confounding factors were taken into account. Like any retrospective study, it has its limitations, including the impossibility of establishing causal relationships such as medical history, risk factors and predispositions of individual patients.

Similarly, as in most studies, we only measured HBs antigen (HBsAg); anti-HBs antibody (anti-HBsAb); HBe antigen (HBeAg); anti-HBe antibody (anti-HBeAb); and total anti-HBc antibody (anti-HBcAb). Determination of IgM and IgG anti-HBc antibodies would have enabled us to distinguish between recently infected and chronic carriers [11].

Conclusion

Hepatitis B is a major public health problem in Senegal, where it is highly endemic. Testing for hepatitis B viral DNA (not available in our laboratory) could enable us to find a higher prevalence by highlighting cases of occult hepatitis B. This is why, for a better management of this pathology, it will be necessary to reinforce screening, care and treatment services.

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