Conceptual Paper
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Hepatitis B virus infection and risk factors for hepatocarcinoma at the China-Guinea friendship hospital of Kipé in Conakry

Abstract

Hepatitis B virus infection is a major public health problem, especially when it becomes chronic and associated to complications such as cirrhosis or primary liver cancer (hepatocarcinoma). The objective of the present study was to determine the seroprevalence of hepatitis B and the risk factors for hepatocellular carcinoma. Material and Methods: This is a prospective study from January 2nd, 2020 to December 15th, 2020 in patients received at the Sino-Guinean Friendship Hospital of Kipé in Conakry. The search for HBsAg and HIV was done respectively with the Determine HBsAg and Determine HBsAg (Abbott, Ireland). The confirmation of these tests as well as the AFP assay was done using the miniVidas automaton (bioMérieux, France). ASAT and ALAT transaminases were measured using the BS-320 automaton (China, Shenzhen). Results: The male sex was predominant with 71.3% (sex ratio M/F=2.48). The average age was 39.45 years with extremes of 10 years and 97 years. The prevalence of HBsAg was 15.34% (188/1225). A rise in ALT and AST was observed in 11.7% of patients tested for these two markers. The AFP level was high in HBsAg+ patients (8%) with values above 400IU/ml. The prevalence of HIV/HBV co-infection was 3.2% (6/182). Conclusion. These results show a high prevalence of hepatitis B in Guinea. HIV/HBV coinfection is considerable and the risk of developing hepatocellular carcinoma is high in HBsAg+ patients.

Keywords: HBV, HIV, infections, AFP, hepatocarcinoma, Conakry/Guinea

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Abbreviations: HBV, hepatitis B virus; HIV, human immuno-defeciency virus; AFP, alpha-feto protein

Introduction

Hepatitis B virus infection is a major public health problem worldwide. Indeed, the number of chronic carriers of HBsAg is estimated worldwide at 350 million people.[1,2] This affection prevails in all the regions of the world with different proportions. Indeed, the high proportions of endemicity are located in countries of sub-Saharan Africa and Southeast Asia.[1–5]

Regions with medium prevalence of hepatitis B are Eastern Europe, North Africa, Greece and Japan, while regions with low prevalence of HBV are Northern Europe and the United States. from America.[2] HBV is transmitted vertically, from the mother to the newborn at the time of birth, and horizontally, to contact subjects living in the entourage of infected subjects, particularly in the perinatal period.[5]

The other modes of contamination are percutaneous or mucosal exposure to infected blood, or other biological secretions, and sexual transmission favored by risky behavior (multiple sexual partnerships, polygamy, male homosexuality, mode of circumcision, etc.).[5,6] This virus causes acute hepatitis which progresses to chronic hepatitis in 5% in adults, and up to 90% in children.[7] Complications of hepatitis B in cirrhosis and primary liver cancer are associated with 650,000 annual deaths worldwide.[8,9]

For HIV, the number of carriers is approximately 37 million worldwide, with 2.6 million cases of HIV/HBV co-infections.[8-10] In 2019 Makanéra et al found in Guinea that the seroprevalence of HBV was 17.9%, that of HIV was 10.5% and that of HIV/HBV coinfection was 2.3%, thus suggesting that this different HIV prevalence was a major public health problem in Guinea.[4] The objective of this study was to determine the prevalence of HBV and the risk factors for hepatocellular carcinoma by HBsAg research and the assay of alpha fetoprotein and transaminases, but also HBV/HBV coinfection at the China-Guinea Friendship Hospital in Kipé in Conakry.

Material and methods

This was a prospective descriptive study that took place from January 2nd 2020 to December 15th 2020. Our study population consisted of all the patients who came to the biomedical laboratory for a diagnosis of HBV and other markers. The sampling concerned all patients referred to the laboratory for an HBV screening test as part of a routine check-up (hospitalized or not) or for voluntary screening. Sampling was exhaustive. The serum and plasma samples used for the various tests were obtained after sampling the venous blood of the concerned patients.

Alfa foetoprotein values greater than 2IU/ml were considered elevated and those less than or equal to 2IU/ml were considered normal. HIV research for the detection of cases of co-infection in HBsAg carriers was carried out using *Determine HIV* (Abbott) and *Determine HBsAg* (Abbott, Ireland) and miniVidas (bioMérieux, France). The dosage of ALAT and ASAT transaminases was done with the BS-320 automaton (Mindray, Shenzen, China). The AFP assay was also performed at the miniVidas. All the data concerning the socio-demographic and biological aspects were collected using the registers of the serology unit and the electronic data of the laboratory and are reported on a survey sheet.

Results

The search for HBsAg showed a prevalence of 15.34% (188/1225) (Figure 1). Male patients were more represented in the study with a frequency of 71.3% against 28.7% for females. The Table 1 shows

that mean age of the patients was 39,45 years (Standard deviation: +/-14.43 years; min = 10 years, max= 97 years).

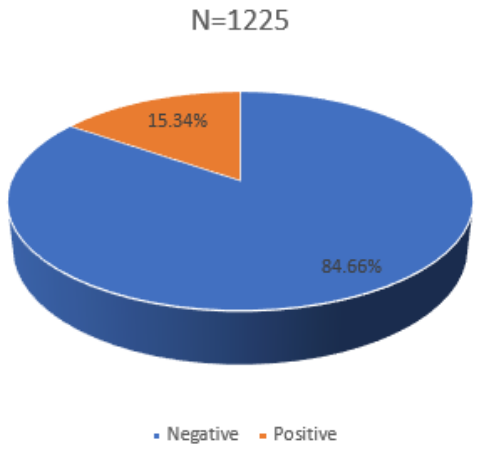

Figure 1 Frequency of HBsAg carriage in the 1225 patients tested.

Discussion

We conducted a prospective descriptive study on the prevalence of hepatitis B virus by detecting HBsAg from January to December 2020 at the HASIGUI biomedical laboratory. We also assayed certain markers of liver damage: AFP and transaminases to assess the biochemical action and HCC. Thus, the prevalence of HBsAg was 15.34% amongst the 1225 patients tested. The distribution of patients carrying HBsAg+ by sex showed a predominance of seroprevalence in the male sex with 71.3% against 28.7% for the female sex, i.e., a sex ratio of 2.4.

The higher frequency of HBV in men is constantly reported in the literature. [11,12] It may be explained by genetic factors favoring the persistence of the virus in humans.[13] In Mali, Dao et al reported a prevalence of 27.8% for males against 21.1% for females.[14] Thus, in a male population of Ivorian gendarmes, a prevalence of 15.6% of HBsAg carriage was found by Kra O et al.[15]

These many data, which indicate a higher frequency of HBsAg carriage in men, deserve further investigation in order to verify whether male gender constitutes a risk factor for infection. The distribution of patients with HBsAg+ according to age group allowed us to see that the most affected group was that of 30-39 years with 28.7%. with an average age of 39.45; Standard deviation: +/-14.43 years; with extremes min = 10 years, max= 97 years. These being the other age groups are also affected by the carriage of HBsAg (Table 1).

Our study thus showed that the seroprevalence of HBsAg was higher in adults than in children. This would be explained by the fact that this age group is sexually active and is more exposed than other groups to risky behavior.

The low carriage of HBsAg in children will probably be explained by the absence of a pediatric service in our study center.

The average age of our patients was different from that found by Agbenu et al in Togo who had reported an average age of 29 ± 13.5 years.[16] The Distribution of Patients with HBsAg+ according to profession showed that civil servants (officials) constitute the socio-professional category most affected with 25.5%, followed by traders/merchants with 17.0% (Table 2).

The high rate of HBsAg among civil servants and traders/merchants could be explained by their high representativeness among the total number of patients seen. This result is different from those of Katilé et al.[17] in 2018 in which the most affected socio-professional categories Housekeepers.

Table 1 Distribution of patients with HBsAg according to age group

Age (years)	Number	Percentage
19-Oct	6	3.2
20 - 29	42	22.3
30 - 39	54	28.7
40 - 49	40	21.3
50 - 59	30	16
60 - 69	8	4.3
≥ 70	8	4.3
Total	188	100

Mean age 39,45; Standard deviation: +/-14.43 years; min = 10 years, max= 97 years.

Table 2 Breakdown of HBsAg positive patients according to profession

Profession	Number	Percentage
Officials	48	25.5
Traders/Merchants	32	17.0
Military	27	14.3
Drivers	21	11.1
Households	18	9.5
Farmers	17	9.0
Pupils/Students	13	6.9
Workers	8	4.2
Others	4	2.1
Total	188	100

The distribution of patients carrying HBsAg+ according to origin showed that those coming from the commune of Matoto represented the largest proportion with 31.9%, followed by Ratoma with 30.9% and within the country with 17 .0%. The high representativeness of patients from this municipality in our study population could explain this result of their proximity to this center and the study site (Table 3).

Table 3 Distribution of patients with HBsAg according to residence

Residence	Number	Percentage
Matoto	60	31.90%
Ratoma	58	30.90%
Dixinn	15	8.00%
Kaloum	12	6.40%
Matam	11	5.90%
Intérieur du pays	32	17.00%
Total	188	100%

According to the departments of origin, our study showed that 24.5% came from the Visceral Surgery department, followed by the Cardiology department with 21.8% and the Emergency department with 20.70%. The high frequency of requests for HBsAg screening among patients in the Visceral surgery departments would be due to the fact that this parameter is systematically requested in the assessment of patients before surgical interventions in the context of the prevention of accidents exposing to blood and to other biological fluids (Table 4).

In our study, HBV/HIV co-infection was found in 6 of our patients, i.e., a prevalence of 3.2% (Table 5).

In addition to the risks associated with HBV alone, there are others that may be associated with HIV/HBV coinfection. HIV infection accelerates the progression of hepatitis B to cirrhosis

and hepatocellular carcinoma, with higher mortality than in mono-infected individuals, since it represents the second cause of death in PLHIV on antiretrovirals. It is for this reason that the management of co-infection remains a priority. Our results can be superimposed on that of Makanera A et al.[4] who found in 2019 a prevalence of 2.3%. The distribution of patients carrying HBsAg+ according to the levels of ALT and AST transaminases measured in 90 patients showed that 68 patients, or 36.2%, had a normal level with AST values less than or equal to 39 IU/. against 22 patients or 11.7% had an AST level greater than 39UI/l.

Table 4 Distribution of HBsAg+ patients according to department of origin

Department	Number	Percentage
External	27	14.3
Cardiology	41	21.8
Visceral surgery	46	24.5
Emergency	39	20.7
Neurology	3	1.6
Neurosurgery	11	5.9
Traumatology	20	10.6
Intensive care unit	1	0.5
Total	188	100

Table 5 Distribution of patients with HBsAg according to HBV-HIV co-infection

HIV	Number	Percentage
Positive	6	3,2%
Négative	182	96,8%

As for ALT, the values were less than or equal to 38UI/l in 68 patients, i.e., 36.2% and greater than 38UI/l in 22 patients, i.e., 11.7%. It is admitted that the dosage of transaminases is particularly used in as part of a liver test, to detect cytolysis or to monitor the evolution of liver disease. In general, the values of the two specific transaminases are disturbed in patients with acute or chronic hepatitis, more precisely ASAT (Table 6).

Table 6 Dosage of transaminases (ALAT/ASAT) in HBsAg carriers

ASAT	Number	Percentage
≤ 39 UI/L	68	36,2%
> 39 UI/L	22	11,7%
Unrealized	98	52.1
Unrealized	98	52,1%
ALAT		
≤ 38 UI/L	68	36,2%
> 38 UI/L	22	11,7%
Unrealized	98	52,1%
Total	188	100%

Finally, the AFP assay was performed in 63 patients, or 55.9%. Among them, 48, or 25.5%, had an AFP less than or equal to 200ng and 15 patients, or 8%, had an AFP greater than 400UI. In general, significantly elevated AFP values are in favor of hepatocellular carcinoma in adults. Which is probably the case in these patients, regular follow-up will make it possible to better provide good care that evolves towards HCC (Table 7).

Table 7 Dosage of alfa foetoprotein (AFP) in HBsAg carriers

Alfa foetoprotein	Number	Percentage (%)
≤ 2 UI/ml	48	25.5
> 2 UI/ml	15	8.0
Unrealized	125	66.5
Total	188	100

Conclusion

Hepatitis B virus infection is a public health problem in our context. The seroprevalence obtained confirms the high endemicity of HBV infection in Guinea, although the results studied are not representative of the general population, these data need to be confirmed by a national scale study with random recruitment in order to better understand the current extent of hepatitis B in Guinea.

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Conflicts of interests

The authors declare that there are no conflicts of interest.

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