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Sero-Epidemiological Profile of Markers of Hepatitis B Viral Infection in Cancer Patients at the Yaounde General Hospital

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ABSTRACT

Background: *Hepatitis B virus (HBV) infection is a public health issue worldwide. In Cameroon, its seroprevalence was 11.2% in 2018. However, data specific to cancer patients is missing and the risk of reactivation of viral hepatitis B in patients treated for cancer is not negligible. The objective of this study was to determine the seroepidemiological profile of markers of viral hepatitis B infection in cancer patients at the Yaounde General Hospital (HGY).* ***Materials and methods:*** *This cross-sectional study was conducted from March 2018 to December 2018. Total of 244 cancer patients was recruited from the HGY Oncology Department. Hepatitis B viral markers (HBs Antigen, HBe, and HBc Antibody, Anti-HBs, Anti-HBe) were determined by immunochromatographic assay (OnSite HBV-5 rapid test) in serum samples of patients.* ***Results:*** *Total 28 men (11.48%) and 216 women (88.52%) were recruited. The average age was 44.07 ± 1.57 years old. The majority of patients had breast cancer (77.05%), 24/244 patients had HBsAg positive (9.84%), 32/244 anti-HBc positive (13.11%), 32/244 anti-HBe positive (13.11%) and 64/244 anti-HBs positive (26.23%), 4/244 patients had acute hepatitis (1.64%), 20/244 patients were inactive carriers (8.20%), 20/244 were cured (8.20%), 48/244 were immunized by vaccination (19.67%) and 152/244 were free from hepatitis B (62.30%).* ***Conclusion:*** *HBV testing should be performed in patients scheduled for cancer chemotherapy and those tested negative should be advised to join the vaccination programme. About 8.2% of patients are at a risk for reactivation of hepatitis when receiving chemotherapy.*

Keywords: Hepatitis B, Cancer, Reactivation, Sero-epidemiological

INTRODUCTION

Viral hepatitis B (HBV) refers to an inflammation of the liver caused by the Hepatitis B virus. It is a serious public health problem in the world and in particular Cameroon with a prevalence of 11.2% [1]. It can be acute when a person is first infected with the virus, or chronic when the infection persists for more than 6 months [2]. Chronic hepatitis B evolves in 3 phases: the immune tolerance phase, the immune clearance phase with seroconversion of hepatitis B surface antigen (HBsAg), and the inactive phase after seroconversion of Hepatitis B envelope antigen (HBeAg) [2-5]. During the inactive phase, viral reactivation may occur and induce active chronic hepatitis B [6]. The reactivation of

hepatitis B refers to the resumption of high replication of the virus. It may be spontaneous or may be induced by the administration or discontinuation of immunosuppressive therapy including chemotherapy [6]. However, cancer is a real public health problem with about 15,000 new cases each year in Cameroon [7]. On the one hand, we know that HBV is a risk factor for cancer development [5,8]. The occurrence of cancer can be seen as a failure of the immune system to control and eradicate the cancerous mass [9]. Chemotherapy may suppress the immune system and cause an increase in HBV viral load or lead to viral reactivation. Hence, cancer patients could be more likely to contract a virus and develop the disease. This hypothesis leads us to determine the seroprevalence of HBV markers in cancer patients. This study sees its importance in the fact that in Cameroon we don't have enough information about HBV in patients with cancer.

SUBJECTS AND METHODS

Description of the Study

This was a cross-sectional study carried out from March 2018 to December 2018. The study took place in the Oncology Department of the Yaounde General Hospital. The study population consisted of cancer patients received in oncology clinics. Patients with histologically diagnosed cancer, on chemotherapy or no-chemotherapy, who gave informed consent were recruited. The recruitment was consecutive and non-probabilistic.

The data collection was done in the consultation rooms using a questionnaire administered directly to the participants. A blood sample was then taken from the patients to determine their Hepatitis B viral serology (HBsAg, HBe, anti-HBcAb, anti-HBs and HBe). The questionnaire identified socio-demographic data (date of birth, sex, place of residence, occupation of patient), tumor and therapeutic data (type of cancer, stage of cancer, grade of cancer and the type of chemotherapy received neoadjuvant, adjuvant or palliative) and data related to serology (the presence or absence of HBsAg, HBe, anti-HBcAb, anti-HBs and anti-HBe, the serological status of patients).

Whole blood samples were collected in previously labeled dry tubes, which were centrifuged and aliquots of the serum transported to the laboratory at the Catholic University of Central Africa (UCAC), Yaounde, for analysis. A rapid immunochromatographic test called OnSite HBV-5 rapid test consisting of 5-panel test strips assembled in a cassette was used for the detection of viral markers of Hepatitis B (HBsAg, HBe, anti-HBcAb, anti-HBs and Anti-HBe).

Statistical Methods

For the comparison of means, we used the Student's T-test. For frequency comparison, we used Fisher's exact test. A p-value of less than 0.05 was considered statistically significant. The data collected was recorded on the Microsoft Excel 2007 software and analyzed using Epi Info software version 7.0.

Ethical Consideration

A research authorization and an ethical clearance were obtained respectively from the Yaounde General Hospital and the National Ethics Committee for Research on Human Health. To ensure confidentiality in our study, we assigned patients codes as they were recruited. We have personally provided the results of blood tests to patients confidentially. All patients with at least 1 marker (except patients already vaccinated) were referred to gastroenterology for appropriate management. Patients free from Hepatitis B viral infection were encouraged to take the HBV vaccine.

RESULTS

A total of 244 patients participated in the study, of whom 28 were men (11.48%) and 216 were women (88.52%) with a sex ratio of 0.13 for women. The mean age of our patients was 44.07 ± 1.57 years with extremes of 20 years and 85 years. The average age of men was 43.43 years and that of women was 44.15 years. The modal class was 30-40 (31.15%), followed by 40-50 (29.51%). The study population was mostly composed of housewives (47.5%) and civil servants (16.4%). Patients residing in Yaounde accounted for 86.89% of our sample and those residing outside Yaounde (Douala, Bafoussam, Mbouda, and Longo) accounted for 13.11%.

Breast cancer was the most represented cancer in our study population and involved 188 patients or 77.05%. Other cancers include colon and ovarian adenocarcinoma, parotid, bronchial, endometrial cancer (1.64% each) and synovial sarcoma (3.28%). Low-grade cancers were most prevalent in the study population with 72.13% and 60.66% of the cancers were late-stage (Table 1).

Table 1 Distribution of study population according to tumor characteristics

Variables	Frequency n (%)
Type of cancer	
Breast cancer	188 (77.05%)
NHL	20 (8.20%)
Kaposi's sarcoma	8 (3.28%)
Others	28 (11.48%)
Grade of cancer	
Low grade	176 (72.13%)
High grade	40 (16.39%)
Unknown Grade	28 (11.48%)
Stage of cancer	
Stage I	24 (9.84%)
Stage II	48 (19.67%)
Stage III	76 (31.15%)
Stage IV	72 (29.51%)
Unknown Stage	24 (9.84%)
Total	244 (100.00%)

Of the 244 patients enrolled in the study, 76 patients had already initiated chemotherapy (31.15%) and 168 patients had not yet started chemotherapy (68.88%). Patients who received neoadjuvant chemotherapy were most represented in our study (65.57%) (Table 2).

Table 2 Distribution of study population according to chemotherapy

Variables	Frequency n (%)
Indication of Chemotherapy	
Neoadjuvant	160 (65.57%)
Adjuvant	68 (27.87%)
Palliative	16 (6.56%)
Total	244 (100.00%)

The proportions of viral markers: HBsAg, HBcAb, HBeAg, and HBsAb in our study population were 9.84%, 13.11%, 13.11%, and 26.23%, respectively. No patients were presented with HBeAg. About 92 (37.70%) patients had no Hepatitis B viral marker.

The study population was predominantly dominated by patients free from Hepatitis B (62.30%). No patients were active carriers of Hepatitis B and a total of 44 patients had contact with the Hepatitis B virus (18.03%) among whom, 4 had acute hepatitis (1.64%), 20 had markers that showed an old infection (8.20%), and 20 were inactive carriers of hepatitis B (8.20%).

The frequency of HBsAg was 28.27% for men and 16.67% for those over 60 years (Table 3). The frequency of HBsAg (11.11%) was high among retailers and 11.32% among patients were residing in Yaounde.

Table 3 Distribution of HBsAg by sex and age

Variables	Ag HBs		Total	p-value
	Positive n (%)	Negative n (%)		
Sex				
Female	4 (7.41%)	50 (92.59%)	54 (100.00%)	0.14
Male	2 (28.57%)	5 (71.43%)	7 (100.00%)	
Age (year)				
20-30	1 (16.67%)	5 (83.33%)	6 (100.00%)	0.71
30-40	2 (20.00%)	17 (80.00%)	19 (100.00%)	
40-50	1 (5.56%)	17 (94.44%)	18 (100.00%)	
50-60	1 (8.33%)	11 (91.67%)	12 (100.00%)	
60-70	1 (33.33%)	2 (66.67%)	3 (100.00%)	
70-90	0 (0.00%)	0 (0.00%)	3 (100.00%)	

In the study population with breast cancer, the proportion of HBsAg is 6.38%. The proportion of HBs Ag is 9.09% in low-grade cancers and 16.67% in stage I and IV cancers (Table 4). The prevalence of HBsAg was 11.76% in patients who received adjuvant chemotherapy and 10.00% in those who received neoadjuvant chemotherapy (Table 4).

Table 4 Distribution of HBsAg according to the tumor and therapeutic characteristics of patients

	Ag HBs		p-value
Variables	**Positive n (%)**	**Negative n (%)**	
Type of Cancer			
Breast Cancer	12 (6.38%)	176 (93.62%)	0.13
NHL	4 (20.00%)	16 (80.00%)	
Kaposi's Sarcoma	0 (0.00%)	8 (100.00%)	
Others	8 (28.57%)	20 (71.43%)	
Grade of Cancer			
Low grade	16 (9.09%)	160 (90.91%)	0.18
High grade	00 (0.00%)	40 (100.00%)	
Unknown grade	8 (28.57%)	20 (71.43%)	
Stage Of Cancer			
Stage I	4 (16.67%)	20 (83.33%)	0.52
Stage II	0 (0.00%)	48 (100.0%)	
Stage III	8 (10.53%)	68 (89.47%)	
Stage IV	12 (16.67%)	60 (83.33%)	
Stage inconnu	0 (0.00%)	24 (100.00%)	
Indication of Chemotherapy			
Neoadjuvant			1.00
Adjuvant	8 (11.76%)	60 (88.24%)	
Palliative	0 (0.00%)	16 (100.00%)	
Total	224		

Of the 20 inactive carriers, 12
30 years, and 60 years old (Table 5).

Table 5 Distribution of HIV status by sex, age, type of cancer and chemotherapy

(N=total number)	Acute Hepatitis	Inactive Carrier	Heal	Vaccines	Hepatitis B Free	p-value
	n (%)	n (%)	n (%)	n (%)	n (%)	
Sex						
Female	4 (1.85%)	12 (5.56%)	20 (9.26%)	48 (22.22%)	132 (61.11%)	0.21
Male	0 (0.00%)	8 (28.57%)	0 (0.00%)	0 (0.00%)	20 (71.43%)	
Class of Age						
20-30	0 (0.00%)	4 (16.67%)	0 (0.00%)	0 (0.00%)	20 (83.33%)	0.71
30-40	4 (5.26%)	4 (5.26%)	4 (5.26%)	12 (15.79%)	52 (68.42%)	
40-50	0 (0.00%)	4 (5.56%)	12 (16.67%)	20 (27.78%)	36 (50.00%)	
50-60	0 (0.00%)	4 (8.33%)	4 (8.33%)	16 (33.33%)	24 (50.00%)	
≥ 60	0 (0.00%)	4 (16.67%)	0 (0.00%)	0 (0.00%)	20 (83.33%)	
Type of Cancer						
Breast	4 (2.13%)	8 (4.26%)	20 (10.64%)	44 (23.40%)	112 (59.57%)	0.50
Others	0 (0.00%)	12 (21.43%)	0 (0.00%)	4 (7.14%)	40 (71.43%)	

Chemotherapy						
Neoadjuvant	0 (0.00%)	16 (10.00%)	8 (5.00%)	32 (20.00%)	104 (65.00%)	0.43
Adjuvant	4 (5.88%)	4 (5.88%)	12 (17.65%)	14 (23.53%)	32 (47.06%)	
Palliative	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	16 (100.00%)	
	4 (1.64%)	20 (8.20%)	20 (8.20%)	48 (19.67%)	192 (62.30%)	
Total	244					

DISCUSSION

The objective of this study was to determine the seroepidemiological profile of Hepatitis B viral markers in cancer patients received in the Oncology Department of the Yaounde General Hospital. Our study concerned 244 cancer patients who came for consultation at the Oncology Department of the Yaounde General Hospital. About 28 of these patients, were men (11.48%) and 216 were women (88.52%). Our study population was therefore predominantly female with a sex ratio of 0.13. These results are related to those of Braka, et al., who found a higher proportion of women (57%) than men in a Ugandan workforce [10]. This can be explained by the fact that the majority of patients who come for a consultation to the HGY Oncology Department were women.

The average age of patients was 44.07 ± 1.57 years with extremes of 20-85 years. The most represented age group was 30-40 years with a frequency of 31.15%. Our results were superior to those found by Ilboudo in Bobo Dioulasso where the average age of patients infected with HBV was 37.8 ± 9.8 years with extremes ranging from 18-64 years [11]. The difference with the Ilboudo study is that the majority of patients in our study were adults.

About 47.5% of the patients were without professional activity and 86.89% of the patients resided in Yaounde compared to 13.11% who resided outside Yaounde. In our study, breast cancer was the most prevalent form of cancer present in 77.05% of our participants. This distribution of cancer is perfectly characterized in our country [12]. In 2012 among the population of Yaounde, breast cancer was the most common cancer in women [13]. This could also be explained by the predominance of women in our study population.

The prevalence of HBsAg in our study population was 9.84%. It is close to that of the general population of Cameroon [1]. Some authors in Cameroon reported the comparable prevalence of 10.1%, respectively, in a population of patients with HBV/HIV co-infection and 10.7% in blood donors [14,15]. This could be explained by the fact that our population is in an area of high hepatitis B virus endemicity. Prevalences lower than ours have been reported in HIV-infected patients in rural areas. South Africa and in the Malian blood donor population was with respective values of 0.4% and 1.13% [16,17]. However, this prevalence of HBsAg was low compared to that reported by Ilboudo [11]. He noted a prevalence of 15.3% in 543 HIV-infected patients. These findings may be due to HBV-HIV co-infection in these patients. Because by maintaining HBV replication, HIV makes them less able to eliminate HBV after acute infection.

A male predominance of carriage of HBsAg was found in our study (28.57%). But no significant difference in the prevalence of HBsAg by sex was observed (p=0.14). This corroborates the result of Abdramane who showed during a routine screening at Gabriel Toure University Hospital in Bamako, the prevalence of HBsAg in males of 21.6% [18]. In addition, we did not observe a significant difference in the prevalence of HBsAg based on other sociodemographic, tumoral and therapeutic characteristics of patients.

The prevalence of HBcAb in our study population was 13.11%. In the study by Biwole, et al., a higher rate (57%) of HBcAg in HBsAg negative blood donors in the Douala Laquintinie Hospital was reported [19]. This overall rate of HBc Ab found in our study is also lower than the results observed in Korean and Moroccan workers [20,21]. In contrast, a prevalence lower than ours (4.97%) was found in 2015 in a study among Iranian dentists [22]. This difference in frequency of HBcAb compared to other studies can be explained by the natural difference that is attached to different geographical areas.

An overall rate of 26.23% for HBsAg was found in our study population. About 8 of the patients who had the HBsAg (3.28%) were HBc positive and 8 of the patients who had HBsAg (3.28%) were HBeAb positive. This suggests that they have been infected with HBV in the past. In contrast, HBeAg was not found in our study population.

In contrast to the 2012 Akinbami study, which showed a prevalence of HBeAg of 8.2% in blood donors [23]. This difference can be explained by the fact that it is not the same population that has been studied, in addition, their study concerned blood donors were already HBsAg positive. The probability of having HBeAg positive is, therefore, higher in these patients if a recent infection is taken into account.

In our study population, 44 patients had been in contact with the Hepatitis B virus (18.03%) and 20 patients had markers that showed an old infection (8.20%). We did not establish a significant association between HBV status of patients and sociodemographic, tumoral and therapeutic characteristics.

The inactive carriage of HBsAg was 8.20% in our study with the highest proportion of inactive carriers (16.67%) in the 20-30 years of age group and in older patients 60 years old. A study in 3 hospitals in Yaounde, found in the general population, a chronic carriage of HBsAg of 92.1% of whom the highest proportion of chronic carriers (66.2%) was in the age range 20-29 years [24]. This would mean that the probability of an inactive carrier becoming a chronic carrier is not 0 in our study population, hence there is a need to follow the evolution of these markers.

The majority of patients in our study were free from Hepatitis B 152 (62.30%) which is significantly higher than the proportion of patients who were free from Hepatitis B (0.31%) found in 2015 [22]. This observed difference may be due to the large size of their sample. Total 48 of the patients in our study were vaccinated against hepatitis B (19.67%) which was this time below the result found by Akhoundi, et al., (88.53%) [22]. This is probably due to the fact that vaccination against Hepatitis B in oncology is not sufficiently popularized in the Cameroonian context.

CONCLUSION

The prevalence of HBs antigen, a marker for the presence of Hepatitis B, was 8.2% in cancer patients in this study. It is therefore not uncommon to find an HBV infection in patients who have cancer other than that of the liver. This latent infection is likely to be reactivated by anticancer chemotherapy. Hence the need to routinely screen for HBV markers before initiating chemotherapy, and in case of chronic carriage of HBs antigen, pre-emptive treatment prior to chemotherapy is recommended.

A longitudinal study could be considered in all oncology departments in Cameroon including the search for viral DNA to include the case of occult hepatitis in cancer patients.

DECLARATIONS

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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