

Seroepidemiology and risk factor of hepatitis B and C virus infections in hemodialysis patients in Lomé, Togo.

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Abstract

Background: The prevalence of hepatitis B surface antigen (HBsAg) and anti-HCV infection (anti-HCV) among hemodialysis patients (HD) varies from country to country and from one center to another. This cross-sectional study was conducted to investigate seroprevalence and associated risk factors for HBsAg and anti-HCV markers among hemodialysis patients in S.O. CHU in Lomé.

Materials and methods: Structured questionnaires were used to obtain socio-demographic data and sera were tested for HBsAg and anti-HCV among End Stage Renal Disease (ESRD) patients undergoing hemodialysis in S.O. CHU in Lomé. **Results:** Out of 75 patients enrolled in the study, HBsAg and anti-HCV were detected in 6 (8%) and 11 (14.7%) patients respectively. Anti-HCV and HBsAg seropositivity were not associated with the hemodialysis session ($p = 0.88$) and ($p = 0.91$) respectively. Furthermore, Univariate analysis showed that, sex, tattoo before dialysis and a history of surgery were not a significant risk factors for HBsAg and HCV seropositivity. The follow-up of the ALT in the both patients (HCV and HBsAg) showed very high significant variation ($p = 0.000$) and ($p = 0.02$) respectively. **Conclusion:** Prevalence of HBsAg and anti-HCV in hemodialysis patients seems low in Lomé. It is recommended to check the patients for HBsAg and anti-HCV before admission to the centers.

Introduction

The susceptibility to acquire viral hepatitis during hemodialysis (HD) has numerous potential underlying reasons related to both the patient and the HD procedure. First, although the rate of blood products transfusions has decreased since the introduction of erythropoietin stimulating agent, HD dependent patients still subject of frequent transfusions¹; the second, is that the hemodialysis

machines and membranes are shared between different patients which upsurges the risk of direct blood cross contamination within one HD unit; the third is low protective value of vaccination against HBV transmission in HD patients compared to general population and finally, high rate of chronicity among End stage renal disease (ESRD) patients when exposed to HBV or HCV infection versus the general population¹⁻³. Acquiring HBV and/or HCV infection has long-term impact on morbidity and mortality of HD patients. It has been proposed that, HCV seropositivity is associated with mortality in HD patients⁴. Moreover, HBV and/or HCV infection changes the clinical course and the prognosis after kidney transplantation⁵⁻⁷. In Togo, HBV and HCV prevalence in HD patients has not been widely studied previously. The available studies were limited to few dialysis centers. Checking the extent of both viruses infection allowing control protocols and the general means to prevent transmission of hepatitis infection in ESRD patients on HD². The aims of this study are to estimate the seroprevalence and associated risk factors for HBsAg and anti-HCV markers among hemodialysis patients at the S.O. CHU in Lomé.

Materials and methods

This cross-sectional study conducted at the Centre Hospitalière Universitaire Sylvanus Olympio and TAAMBA Clinic, hemodialysis unit, Lomé during January-October 2020. All the 75 patients who underwent hemodialysis for End Stage Renal disease in the study period were enrolled. After written, informed consent, the relevant medical and socio-demographic characteristics were gathered using pre-tested questionnaires. Blood sample (4ml) was collected in two plain tubes (EDTA and hemolysis), allowed to clot and centrifuged at room temperature. The sera were then tested immediately for HBsAg and anti-HCV uses ELISA kits at NGO ASADH (Association Sauvons l'Afrique Des Hépatites), 04BP: 863 Lomé Togo and Pietro Annigoni Biomolecular Research Center (CERBA), 01 BP 364 Ouagadougou 01, Burkina Faso. The AxSYM HBsAg version 2.0 kit (Abbott, N, Chicago, IL) was used to determine HBsAg levels. Nonreactive samples were considered negative for HBsAg

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and not test further, while reactive samples were retested to confirm the result. Repeatedly reactive samples were considered positive and not tested further. The AxSYM HCV version 3.0 kit (Abbott) was used to measure anti-HCV antibody levels. Nonreactive samples were considered negative for HCV, whereas reactive samples were retested to confirm the result and repeatedly reactive samples were considered positive.

Statistical analysis

The data were collected, coded and entered to computer. The data were analyzed with statistical package for social science, version 21 (SPSS Inc., Chicago, Illinois, USA). The mean and SD were computed for quantitative data. The association between categorical variables was tested using the chi test. Significance of the obtained results was judged at the 5% level.

Results

Socio-demographic and clinical characteristics.

A total of 75 patients were enrolled in the study, 52 were males (69.3%) and 23 were females (30.7%). The age range of the studied population was 25-81 years with mean \pm SD (49.75 \pm 12.21) years and the duration of hemodialysis was (31.9 \pm 41.8) months. None of the patients were vaccinated against HBsAg (Table 1).

HBsAg and Anti-HCV seroprevalence.

Out of the 75 patients enrolled in the study, HBsAg and anti-HCV was detected in 6 patients (8.0%) and 11 patients (14.7%) respectively. All the patients who were HBsAg positive, was male. One of the patients was infected by both HBV and HCV.

Risk factors for HBsAg or Anti-HCV (Table 2 & 3).

Univariate analysis showed that, gender, tattoo and a history of surgery before dialysis were not a significant risk factors for HBsAg and HCV seropositivity. Furthermore, age, was a risk factor for HBsAg seropositive.

The mean value of ALT in the seropositive group was respectively 31.5 \pm 25.9U/l (HCV), 27.7 \pm 30.7U/l (HBsAg). The mean value of ALT in seronegative group was 13.6 \pm 7.7U/l, 15.2 \pm 10.8U/l, respectively for HCV and HBsAg. This difference between the two groups was found to be statistically significant (P = 0.0000 and p = 0.02, student's test) (Table 4).

(Table 5) shows that, the glomerular and diabetic nephropathies were the commonest type of nephropathies, followed by vascular and indeterminate type.

Table 1. Socio-demographic characteristics of HBsAg, Anti-HCV sero-positive hemodialysis Patients in CHU Sylvanus Olympio and Taamba clinic.

Variables	All patients (N= 75)	HBsAg sero-positive (N= 6)	Anti-HCVsero-positive (N=11)
	Mean \pm SD	Mean \pm SD	Mean \pm SD
Age (years)	49.8 (12.2)	54.2 (10.9)	50.0 (10.5)
Gender			
Male	52 (69.3)	6 (100)	8 (72.7)
Female	23 (30.7)	-	3 (27.3)
Duration of dialysis/months	31.9 (41.8)	30.2 (39.1)	1 (100)
Number of units blood transfused	91 (1.21)	12 (2)	20 (1.8)
Transfusion history	64 (85.3)	2 (0.3)	8 (0.7)
Hepatitis B vaccine			
Vaccinated	-	-	-
Not vaccinated	75	6 (100)	11

Table 2. Factors associated with HBsAg among hemodialysis patients in Centre hospitaliere universitaire Sylvanus Olympio and TAAMBA, Togo using univariate and multivariate analyses.

Variables	Univariate			Multivariate		
	OR	95% CI	P-value	OR	95% CI	P-value
Age	0.2	0.03-1.0	0.036	1.8	1.4-2.4	0.018
Sex	1.5	1.2-1.7	0.089	1	0.5-1.5	0.621
Tattoo before dialysis	1.3	0.9-1.7	0.283	1	0.5-1.5	0.708
History of surgery	2.3	0.9-45.7	0.591	0.8	0.4-1.4	0.819

Table 3. Factors associated with HCV seropositivity among hemodialysis patients in Centre hospitaliere universitaire Sylvanus Olympio and TAAMBA, Togo using univariate and multivariate analyses.

Variables	Univariate			Multivariate		
	OR	95% CI	P-value	OR	95% CI	P-value
Age	0.5	0.09-2.5	0.379	0.8	1.1-2.0	0.555
Sex	1.2	0.3-5.1	0.792	1.6	0.3-1.3	0.621
Tattoo before dialysis	1.3	0.9-1.7	0.283	0.9	0.5-1.3	0.708
History of surgery	2.3	0.1-45.7	0.591	0.9	0.4-1.4	0.819

Table 4. ALT levels in studied groups.

Variables	HCV positive (N=11) mean ± SD	HCV negative (N=64) Mean ± SD	P
ALT levels (U/l)	31.5±25.9	13.6±7.7	<0.05 (0.000)
Hemodialysis sessions	28.7±44.6	30.8±42.6	<0.05 (0.88)
	HBsAg positive (N=6) mean±SD	HBsAg negative (N=68) mean±SD	
ALT levels (U/l)	27.7±30.7	15.2±10.8	<0.05 (0.02)
Hemodialysis sessions	28.7 ± 40.1	30.7±43.0	<0.05 (0.91)

ALT=Alanine aminotransferase ; SD=Standard deviation

Table 5. Different types of nephropathies

Initial Nephropathies	Frequency	Prevalent (%)
Vascular	6	8
Glomerular, diabetic	7	9.3
Indeterminate	2	2.7
Not research	64	85.3

Discussion

Hemodialysis (HD) patients were recognized as one of the high-risk groups for viral hepatitis infection⁸. Viral hepatitis is still a significant health problem especially in HD patients, particularly in the developing countries. Currently, early detection help clinician to better control and prevent the widespread of hepatitis in dialysis unit⁷. Some investigators studied the prevalence of HBsAg and HCV in HD patients, but the results were changeable in different population^{9,10}. This is the first study declare the seroepidemiology of HBsAg and anti-HCV among hemodialysis patients in in Lomé, Togo.

In this study, the prevalence of HBsAg was (8%). This result was similar to that in other African countries, for example in Kenya¹¹, but higher than that found in other study 4.5%¹². Different studies established that, the use of shared HD machine was linked with high HBsAg prevalence in HD patients⁷. Sartor et al, conveyed that, using shared devices in HD patients are associated with increased risk of viral infection¹³.

In the present study, the prevalence of anti-HCV seropositivity was 14.7%, which is higher than that found in

Sudan (8.5%)¹², but lower compared with that reported from hemodialysis centers in Middle-East countries (25.3%) and in the Egypt (60,9%)^{3,12,14}. However, the prevalence of anti-HCV varies widely from country to country and also from center to center, even within the same country¹⁵. This can be ascribed to variation in the application of infection control measures in these hemodialysis units¹⁶. Usually, HCV infection among hemodialysis patients is asymptomatic¹⁷.

In chronic hemodialysis patients, transaminases levels are lower than in the general population^{18,19} therefore liver enzymes are a poor marker for HCV infection in this population^{15,20,21}. Pol et al., stated an increase in transaminases in merely 31% of chronic hemodialysis patients with positive HCV viraemia²². In our study, there is a significant variation in alanine aminotransferase levels between seronegative and seropositive patients with HCV and HBsAg. In addition, in another study, the monitoring of alanine aminotransferase in the HBsAg and Anti-HCV patients didn't show any notable fluctuations in values²³.

The limitation of this study are that, small number of the patients and only anti-HCV and HBsAg were taken as criteria to diagnose HCV and HBsAg infection without

PCR. However, the use of single anti-HCV test is still a test of choice for HCV screening as recommended by Centers for Disease Control (CDC). The current CDC recommendations for HCV screening in HD patients include testing for anti-HCV and serum ALT on admission, ALT every month, and anti-HCV semiannually²⁴.

Conclusion

In our study, the prevalence of HBsAg and anti-HCV were 8% and 14.7% respectively. There is need for multicenter studies in Togo as it will give a better image of the burden of these blood borne viral infections in HD. There is urgent need for the implementation of preventive and control measures that will help reduce infections, thereby improving the quality of life and reducing the mortality rate of HD patients.

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