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Prevalence of antibodies to Hepatitis C virus among Nigerian patients with HIV infection

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Abstract:

Nigeria belongs to the group of countries highly endemic for viral hepatitis; unfortunately information on the prevalence of hepatitis C amongst patients with HIV in Nigeria is very scarce. This hospital-based investigation was conducted at two major hospitals in Jos, Nigeria from June 2002 through May 2003. Serum samples from 490 confirmed HIV infected patients were assayed for the presence of antibodies to HCV, using a third generation enzyme linked immunosorbent assay. Twenty eight (5.7%; 95% CI 3.66-7.76%) of the patients had antibodies to HCV. The prevalence of HCV antibodies was higher among the males (7.5%; 95% CI 3.83-11.09%) than the females (4.5%; 95% CI 2.10-6.88%). Statistical analysis showed no significant difference ($\chi^2 = 1.917$, $df = 1$, $p = 0.05$). Individuals of the age group 41-50 years had the highest prevalence of HCV antibodies (15.4%; 95% CI. 7.37-23.29%), followed by those of age group 31-40 years (7.4%; 95%, CI 3.70-11.20%). A significant difference was observed in the association between age and prevalence of HCV antibodies ($\chi^2 = 24.151$, $df = 4$, $p = 0.05$). Early diagnosis of HCV in people with HIV infection is advocated to reduce risk of HCV related advanced liver disease.

Key Words: Hepatitis C virus, HIV, Nigeria

Introduction

The hepatitis C virus (HCV) is a life threatening viral infection of the liver transmitted primarily through infected blood and blood products. Fifteen years after the discovery of the HCV as a major cause of chronic liver disease (1), knowledge of the natural history of the HCV infection is still limited.(2) Approximately 170 million people worldwide are chronically infected with the virus and the infection is often described as "silent" because people may be infected for 10 to 30 years and not exhibit symptoms.(3)

Co-infection with human immunodeficiency virus (HIV) and the HCV is a growing public health concern. Both infections are spread in similar ways, notably through shared use of needles to inject drugs and sexual activity and most studies have shown that HIV infection leads to a more aggressive hepatitis C and a higher risk of liver damage.(4) Natural history studies with HIV-HCV co-infection have also shown more rapid progression of liver disease, and end stage liver disease due to hepatitis C is now a leading cause of death in HIV-infected patients.(5)

Nigeria belongs to the group of countries highly endemic for viral hepatitis. In fact about 75% of the Nigerian population is likely to have been exposed to the hepatitis viruses at one time or the other in their life and about 7% of these will die from its complications.(6) Prior to the advent of HIV/AIDS in Nigeria, there was lack of enforcement of regulations guiding blood transfusion in many localities; this enhanced indiscriminate blood transfusion practices and the dominance of commercial donors among blood donors. In addition, there was also high patronage of patent medicine stores or some other substandard settings for treatment of ailments where unsterilized sharps were often used.(7) Available data showed that the prevalence of hepatitis C virus among local commercial blood donors in Nigeria ranged from 12.3-14.0%.(6, 8) Although a more recent study among patients with sickle cell anemia in Lagos Nigeria indicated a 5.0% anti-HCV prevalence.(9)

The HIV/AIDS epidemic in Nigeria has extended beyond the commonly classified high-risk groups and is now common in the general population. With the adult prevalence rate at 5.0 % (7), the nation is indeed at the threshold of an exponential explosive growth epidemic. Viral hepatitis and HIV/AIDS having become so intertwined have constituted a major public health problem in the country. However in spite of this, very little information on viral hepatitis and HIV co-infection in Nigeria is

available. The few reports documented were only on HBV-HIV co-infection.(10,11) Globally, more attention is being given to HCV-HIV co-infection as a result of its higher frequency of chronic diseases (5) and more so, HCV-HIV co-infection is capable of impairment of the immune system recovery after starting antiretroviral therapy, thereby complicating treatment.(5)

Our objective in this study therefore was to determine the prevalence of HCV antibodies in HIV infected Nigerian population. This is aimed at providing baseline data on HCV-HIV co-infection as part of the preliminary investigation on the dynamics of HCV infection in immuno-compromised Nigerians.

Materials and Methods

Study Area

The study was conducted from June 2002 through May 2003 in Jos-Plateau located in an area covering about 9,400km² of the crystalline complex in central Nigeria. Its average elevation is about 1,250m above mean sea level and has an average annual rainfall of 1500mm and atmospheric temperature ranging from 12°C- 31°C. The area is known to have the most conducive weather in Nigeria and is said to be a tourist haven. Consequently, large numbers of people from many other parts of the country and foreigners alike have been attracted to the area purely to exploit its economic viability. Jos-Plateau and other parts of central Nigeria are reported to have the highest prevalence of sexually transmitted diseases (STDs) particularly HIV-infection.(7,12)

HIV-infected patients:

Patients who visited Jos university teaching hospital (JUTH) and Plateau Specialist Hospital (PSH) who had symptoms suspected to be retroviral in nature were considered for the study. With the assistance of the patients' physicians, informed consent was obtained from each patient with the

assurance that all information obtained would be treated with utmost confidentiality and for the purpose of the research only. Thereafter about 5ml of blood sample was obtained by venepuncture from each of these patients and serum separated for HIV screening. The HIV serostatus of the 490 of them (aged 17-60 years) was confirmed by immunoblot analysis using a commercially available kit (Bio-Rad, Novapath Diagnostic Group, USA) at the International Centre for Scientific Culture (ICSC) Retroviral Laboratory, PSH, Jos. This was after an initial HIV screening using the Vironostica HIV-1 microELISA system also commercially available (Organon Teknika, Durham, USA) at AIDS/Leishmaniasis Research Laboratory, University of Jos and the Jos University Teaching Hospital (JUTH).

Hepatitis C antibody assay:

Serum samples from the 490 confirmed HIV positive individuals were assayed for the presence of antibodies to HCV. Detection of HCV antibodies was carried out by a third generation enzyme-linked immunosorbent assay (ELISA) kit, commercially available (DIA PRO Diagnostic Bioprobes, Srl., Italy) at the Jos University Teaching Hospital, Jos. Manufacturer's instructions were strictly followed to determine the serum samples that were seropositive for HCV antibody.

Statistical analysis:

Differences between proportions were evaluated by the Chi-square test. Statistical significance was achieved if $p=0.05$.

Results

Of the 490 HIV- infected patients studied, 28 (5.7%; 95% CI 3.66-7.76%) had antibodies to HCV. The prevalence of HCV antibodies was higher among the males (7.5%; 95% CI 3.83-11.09%) than the females (4.5%; 95% CI. 2.10-6.88%). Statistical analysis showed no significant difference in the trend ($\chi^2 = 1.917$, $df = 1$, $p = 0.05$) (Table 1).

Table 1: Sex related prevalence of HCV antibodies in the HIV infected patients

Sex	No. examined	No. infected with HCV	Percentage infected with HCV	95% Confidence Interval
Male	201	15	7.5	3.83-11.09
Female	289	13	4.5	2.10-6.88
Total	490	28	5.7	3.66-7.76

Age related prevalence of HCV antibodies in the HIV infected patients was assessed and results showed that individuals of age group 41-50 years had the highest prevalence (15.4%; 95% CI 7.37-23.39%). This was followed by those of age-group 31-40 years (7.4%; 95% CI 3.70-11.2%). Statistically however there exists a significant difference in the association between age and prevalence of HCV antibodies ($\chi^2 = 24.151$, $df = 4$, $p = 0.05$).

Table 2: Age related prevalence of HCV antibodies in the HIV infected patients

Age (years)	No. examined	No. infected with HCV	Percentage infected with HCV	95% Confidence interval
≤20	15	0	0	-
21-30	184	2	1.1	0.42-2.60
31-40	188	14	7.4	3.70-11.2
41-50	78	12	15.4	7.37-23.39
51-60	25	0	0.0	-
Total	490	28	5.7	3.66-7.76

Assessment of the risk factors of HCV transmission showed that of the 79 individuals who had history of blood transfusion, 17 (21.5%; 95% CI 12.44-30.56%) had HCV infection. While of the 398 individuals who admitted having more than one sexual partner, 16 (4.0%; 95% CI 2.07-5.93%) were infected with HCV (Table 3).

Table 3: Risk factors of HCV transmission in the HIV patients [N=490]

Risk factor	No of individuals exposed	No. infected with HCV	Percentage infected with HCV	95% Confidence interval
History of blood transfusion	79	17	21.5	12.44-30.56
History of needle injection at patent medicine stores	124	11	8.9	7.93-25.73
Intravenous drug use	18	3	16.7	0.50-33.93
Multiple sex partnership	398	16	4.0	2.07-5.93

Discussion

In HIV infected patients, co-infection with HCV has been associated with a reduced survival rate.(13) The increased risk of HCV related advanced liver diseases in people with HIV infection makes early HCV diagnosis a priority.(14) Unfortunately this has not been given its desired attention in the Nigerian health care delivery system, largely due to the dearth of information on HCV-HIV co-infection. In this study therefore, we have unequivocally established the existence of HCV infection in HIV-infected Nigerian patients. Our result showed a somewhat lower sero-prevalence (5.7%) compared to those reported in HIV infected patients in Brazil (36.2%) (15), Greece (13.8%) (16), Australia (13.1%) (17) and USA/Europe (35%).(18) The reason for this outcome is not far fetched. It has been established that the overwhelming risk factor for HCV infection in almost all studies, is a history of illicit injection drug use.(15,18,19) This habit, though very efficient in HCV transmission is a rare occurrence amongst the Nigerian HCV infected patients studied. Most cases of the HCV infection in this study may have resulted from blood transfusion as 60.7% (17 out of 28) of the HCV infected individuals had history of blood transfusion. Multiple sexual partnership, a habit very common amongst the study population, may also have had a contributory role in the prevalence of HCV observed in this study although the sexual transmission of HCV appears to be very inefficient and sexual behavior is usually considered of secondary importance in determining the risk of HCV infection.(15,20)

Analysis of the sex-related sero-prevalence of HCV amongst the HIV infected patients showed that the males were more infected than the females, though more of the HIV infected females reported to hospitals for medical attention than the males. The reason for higher frequency of HCV infection amongst the males was not immediately apparent and besides no statistically significant association was observed.

However the prevalence of viral hepatitis is reported to be higher in male Nigerians than the females (10,11), probably due to the higher frequency of exposure to infected blood and blood products by the male folks as a result of occupation and social behavior.(6)

A number of studies in different transmission groups have confirmed that age is a co-factor for disease susceptibility and progression.(21) Our findings indicated that the HIV infected individuals in their fifth decade of life had the highest HCV infection. Also there was a significant difference statistically. The reason for this is somewhat obscure from this study. Further studies on the dynamics of and epidemiology of HCV-HIV co-infection in Nigeria are advocated and could help to explain the trend. In conclusion, it is pertinent to state that one of the major drawbacks in this study was our inability to employ confirmatory assays such as the HCV recombinant immunoblot assay or the HCV-RNA assay. However we have confidence in the capacity of the HCV antibody assay to detect over 95% of HCV infected cases.(20,22) This study has contributed baseline data and provided insights in HCV and HIV co-infection in Nigeria. This would undoubtedly serve as a basis for further studies on this topic.

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