Hepatitis B And C Virus Co-Infections Among Human Immunodeficiency Virus (Hiv) Infected Patients In Enugu, Nigeria.

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Abstract: The aim of this study was to determine the sero-prevalence of hepatitis B and C virus antibodies among 150 Human immunodeficiency virus (HIV) infected patients attending the University of Nigeria Teaching Hospital, Enugu, Nigeria. Veinous blood samples were obtained from the patients and screened for hepatitis B using the Hepatitis B surface antigen (HBsAg) rapid test strip (ACON, USA). The samples were also respectively tested for the presence of hepatitis C virus antibody using the rapid one step hepatitis C virus test strip (ACON, USA). Further, the CD4+ count of the patients were determined. The result of the study showed that 14% of the HIV infected patients examined had Hepatitis B virus antibody, while 4% had hepatitis C virus antibody. The highest rate of hepatitis co-infection was recorded among patients within the 26-35 age groups. It was also observed that 66.7% of the overall hepatitis co-infected patients had their CD4+ count less than 200 CD4+ T cells per micro liter of blood. The concomitant infection of HIV positive patients with HBV and/or HCV tends to bring about reduction in the CD4+ count among the infected patients. The study recommends the routine screening of HIV infected patients in Enugu, Nigeria for HBV and HCV co-infections. Furthermore, the course of the antiretroviral drugs among co-infected individuals should also be evaluated.

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1. Introduction:

Hepatitis B, also referred as serum hepatitis or Dane particle, carries hepatitis B core antigen (HBcAg), hepatitis B surface antigen (HBsAg) and viral DNA. Hepatitis B virus is an enveloped double stranded circular DNA of complex structure, in the family Hepadnaviridae. It is normally, transmitted through blood or other body fluids (Saliva, sweat, semen, breast milk, infected mother to child, urine, feces), in body-fluid-contaminated equipment including shared or poorly sterilized instruments (Cheesbrough, 2002; Willey et al., 2008). Hepatitis C virus on the other hand, is an enveloped single stranded RNA virus of the Flaviviridae family. The major mode of transmission is usually associated with intravenous drug abuse and administration of blood and blood products (Brendon and Thyagarajan, 1998). Sexual exposures among patients with chronic hepatitis C may account for 10-20% of the overall HCV transmission (Dieterich et al., 2004). Prior to routine screening, HCV accounted for more than 90% of hepatitis cases developing after blood transfusion.

Co-infection of HIV with HBV and/or HCV is increasingly recognized worldwide and has the potential of increasing the risk of liver diseases such as cirrhosis, liver failure and hepatocellular carcinoma (Matthews and Dore, 2008). Chronic hepatitis infection is one of the leading causes of morbidity and mortality in HIV infected individuals, mainly in hemophiliacs and intravenous drug users (Soriano et al., 2005). Also, dual infected individuals are said to have altered response to Highly active antiretroviral therapy (HAART) and at increased risk of HAART-related hepatoxicity. The association between HIV and HBV/ HCV co-infection is yet to be fully established in Enugu, Nigeria. The present study therefore aimed at determining the prevalence of HBV and/or HCV among HIV infected patients in Enugu, Nigeria.

2. Materials and Methods:

Sample Population

A total of one hundred and fifty confirmed HIV positive patients attending the University of Nigeria Teaching hospital Enugu, were involved in the study. They were randomly selected between September and December 2008. Their HIV status were determined using an ELISA based kit "Determined" and confirmed by Western blot. The study was carried out in the Department of Microbiology, University of Nigeria Teaching Hospital Enugu, Nigeria.

Collection of Sample and HBV/HCV Screening

Sterile 5ml syringes were used to collect 2ml of blood from 150 HIV positive patients. The samples contained in EDTA bottles were subsequently centrifuged at 2000rpm for 2 minutes. The separated plasma were then subjected to hepatitis B surface antigen (HBsAg) screening using Hepatitis B surface antigen rapid test strip (ACON, USA). Also, the samples were tested for hepatitis C virus antibody using the rapid one step hepatitis C virus test strip (ACON, USA). The manufacturer's instructions were adhered to in the tests which were conducted in duplicate.

Interprertation of results

The visible appearance of two red bars in the control and patients window of the test strip indicated a positive test, while the appearance of only one bar in the control window showed negative result.

Determination of CD4+ count

Determination of the CD4+ count of all the HIV positive participants were done using the CD4+ automated Partec Cyflow counter (Germany).

3. Results:

Out of the 150 HIV positive patients screened for hepatitis B surface antigen (HBsAg), 21 (14%) tested positive. 66.7% were females while 33.3% were males (Table 1). Also, of the total number of patients screened for hepatitis C virus antibody, 6 (4%) were positive (Table 1). It was also observed that while 27.9% of singly infected HIV positive patient's CD+ count ranged from 0-200, 66.7% of dually infected positive had their CD4+ count within the same range (Table 2).

Table 3 showed that co-infection was most among patients within the age ranged 26-35.

4. Discussion:

One major challenge confronting HIV infected patients is concurrent infections with hepatotropic viruses (Tankhiwale et al., 2009; DeAlmeida et al., 2006). The co-infection of HIV and hepatitis virus appears to accelerate the progression of HIV infection to overt disease and could pose therapeutic consequences (DeAlmeida et al., 2006; Tankhiwale et al., 2003; Brendon and Thyagarajan, 1998). HIV-HBV/HCV co-infection seems to affect both AIDS development and overall mortality (Nikolopoulos et al., 2009; Bredon and Thyagarajan, 1998). The 14% HIV-HBV coinfection rate among HIV infected patients in the present study is relatively consistent with the work of Otegbayo et al., (2008) in which 11.9% co-infection was reported . It is however higher than 6.7% and 6% reported in Italy and Kenya respectively (Pontali and Ferrari, 2008; Harania et al., 2008) and much lower than 30.4% reported among HIV infected patients in India (Tankhiwale et al., 2003).Similarly, the prevalence rate of 4% HIV- HCV co-infection recorded in the present work is in line with the 4.8% anti-HCV antibody occurrence previously reported among HIV seropositive patients in Nigeria (Otegbayo et al., 2008). It is however, lower than the 7.27% HIV-HCV coinfection rate reported among HIV infected persons in India (Tankhiwale et al., 2003).

The fact that HIV infected patients are co-infected with HBV and HCV is not surprising since they all share the same common route of transmission. Although sexual route is not known to be an effective mode of HCV spread, sexual transmission of HCV has been reported (Cropley and Main 2000; Wyld et al., 1997; Fainboim et al., 1999; Cata-Soares 2000).

The apparently high occurrence of HBV co-infection among HIV infected patients in the present study is worrisome because previous works had indicated increased risk of morbidity and mortality from HBV-related cirrhosis and hepatocellular carcinoma (McGovern 2007; Toro et al., 2009; Thio 2009). This is indeed a challenge especially in the developing countries where HIV patients are not usually routinely screened for HBV. Further, it has been reported that HIV-syndrome related opportunistic infections drastically decrease the success of anti-HIV therapy (Thio 2009). Management of co-infected patients is often complicated by a number of factors including disease characteristics, drug-drug interactions, and augmented toxicity (Chung 2006). According to Van den Berg et al., (2009), hyporesponsiveness or unresponsiveness to hepatitis B vaccine is apparent in 20-70% of HIV positive patients.

As with HBV co-infection, HCV in HIV infected patients tends to exacerbate the end stage liver disease resulting to cirrhosis, liver failure and hepatocellular carcinoma (De Almeida et al., 2006). HCV is reported to be a leading cause of death in HIV infected persons especially in hemophiliacs and intravenous drug users (Soriano et al., 2005). HCV-HIV dual infection, is equally reported to adversely alter the immunity to HAART and consequently enhances drug interactions and hepatoxicity (Matthews

and Dore 2008; Hughes and Shafran 2006; O'Leary and Chung 2006).

Furthermore, the observation in the present study that over 66% of HBV and/or HCV co-infected HIV patients had their CD4+ count below 200, is in line with previous report in which lower CD4+ levels were observed among dually infected HIV patients (Otegbayo et al., 2008; Idoko et al., 2009). It is most probable that the concurrent infection of the HIV patients with HBV and/ or HCV culminates to the steady reduction in the CD4+ count. This undoubtedly poses an immense threat to HIV infected individuals.

The study also indicated that HIV infected females and patients within the 26-35 age range had the highest co-infection rate. The sexual activity of individuals within this age bracket may not be unconnected with the high prevalence particularly for HBV. This study generally recommends routine screening of HIV infected persons in Enugu, Nigeria for HBV and HCV to enable early detection and better management.

Table 1. HIV and HBV/HCV co-infection with respect to sex

	Male (%)	Female (%)	Total (%)
Total HIV patients examined	75	75	150
HIV patients coinfected with HBV	7(33.3%)	14(66.7%)	21(14%)
HIV patients coinfected with HCV	3(50%)	3(50%)	6(4%)

Table 2. HIV and HBV/HCV co-infection with respect to CD4+ count

CD4+ count	HBV	HCV
< 50	7	3
51-100	2	-
101-150	4	1
151-200	1	-
201-250	-	-
251-300	3	1
301-350	2	-
351-400	1	-
>400	1	1
Total	21	6

Table 3. HIV and HBV/HCV co-infection with respect to patients age

Age range	No tested	HBV co-infection	HCV co-infection
15-25	16	7	-
26-35	58	9	3
36-45	43	4	1
46-55	26	1	2
56>	7	-	-
Total	150	21	6

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