A Serosurvey of Hepatitis B Virus, Hepatitis C Virus, Human T Lymphotropic Virus Type-1 and Syphilis in HIV-1-Infected Patients in Jamaica

MF Smikle, O Heslop, I Vickers, G Dowe, D Deer, R Sue-Ho, CE Denbow,
O St C Morgan, B Bain, EN Barton

ABSTRACT

The seroprevalences of hepatitis B virus (HBV), hepatitis C virus (HCV), human T lymphotropic virus type-1 (HTLV-1) and syphilis were determined in 129 HIV-1-infected patients using commercially prepared reagents. The seroprevalences were HCV, 0% (0/129); HBV, 37% (48/129); HTLV-1, 5% (6/129) and syphilis, 20% (26/129). Fifteen per cent (19/129) of the patients had active/chronic HBV infection. The seroprevalence of HBV was statistically significantly higher in HIV-1 infected men (24/49, 50% versus 17/80, 21%; p = 0.005), while the seroprevalence of syphilis was statistically significantly increased in HIV-1 infected patients in the over-40 age group (10/31, 32% versus 6/53, 11%; p = 0.05). These findings throw the spotlight on HBV infection and syphilis and suggest that these two sexually transmitted infections should be carefully surveyed in patients with HIV/AIDS in Jamaica. It is essential for management protocols in Jamaica to include screening for evidence of these co-infections.

INTRODUCTION

Co-infection with the human immunodeficiency virus type - 1 (HIV-1) impacts negatively on the natural history, treatment and management of other bloodborne sexually transmitted infections (STI) (1-5). Conversely, certain STI modify the clinical course of HIV and response to antiretroviral therapy in HIV-1-infected patients and increase morbidity and mortality (6-16). With this background knowledge, this study was undertaken to determine the seroprevalences of hepatitis B virus (HBV), hepatitis C virus (HCV), human T lymphotropic virus-type-1 (HTLV-1) and syphilis in a cohort of HIV-1-infected patients in Jamaica. This is the first study of its kind emanating from the English-speaking Caribbean, as far as the authors are aware.

METHODS

During 2001 to 2002, diagnostic serological investigations were performed on blood samples of 129 consecutive HIV-infected patients attending the HIV clinic at the University Hospital of the West Indies, a tertiary referral centre. The remnant plasma samples had been kept frozen at -20° C and were retrieved for this study. The samples of plasma were screened for hepatitis B surface antigen (HBsAg), antibodies to hepatitis B core (anti-HBc), hepatitis C virus (anti-HCV) and HTLV-1 by enzyme immunoassay (EIA) and positive HTLV-1 and HCV results were confirmed by western immunoblot using commercially prepared kits (Murex/Abbott Diagnostic Laboratories, Chicago, Illinois). The Treponema pallidum particle agglutination (TPPA) test (Fugirebio Diagnostics, Malvern, Pa) was used in the diagnosis of syphilis.

The prevalence data were compared by Chi-square and Fisher's exact tests where appropriate.

RESULTS

Of the 129 samples of HIV-positive plasma tested, 49 were from male and 80 from female patients. Evidence of co-infection with HIV and at least one other viral STI and syphilis occurred in 46% (59/129) of the samples. Positive tests for HIV and at least two other co-infections were found in 11% (14/129). A total of 54% (70/129) of the samples tested negative for all of the markers of co-infection. The seroprevalence rates of non-HIV viral STI and syphilis are shown in Table 1. Anti-HCV antibodies (0/129, 0%) were not found in any of the samples. Except for HCV, the prevalence of co-infection was high. The distribution of the serologic markers for HBV, HTLV-1 and syphilis in the HIV-1-infected patients is shown in Table 2. Hepatitis B surface antigen was detected in 15% (19/129) of the plasma samples, indicating that 40% (19/48) of patients with evidence of HBV exposure had active/chronic infection. In addition, 53% (10/19) of the HBsAg-positive samples tested negative for anti-HBc.

As shown in Table 3, the seroprevalence of HBV was statistically significantly higher in HIV-1-infected men than in HIV-1 infected women (24/49, 50% versus 17/80, 21%; p = 0.005). HTLV-1 was detected only in plasma samples from women (6/84, 5% in women versus 0/49, 0% in men).

From: Departments of Microbiology and Medicine and Centre for HIV/AIDS Research, Education and Services, The University of the West Indies, Kingston 7, Jamaica, West Indies.

Correspondence: Dr MF Smikle, Department of Microbiology, The University of the West Indies, Kingston 7, Jamaica, West Indies. Fax: (876) 977-1265. e-mail: msmikle@uwimona.edu.jm.

The age distribution of the infections is summarized in Table 4. Age was ascertained in 84/129 (65%) of the patients. The seroprevalence of syphilis was statistically significantly higher in those older than 40 years of age (10/31, 32% versus 6/53, 11%; p = 0.05).

Table 1: Seroprevalence of hepatitis B virus (HBV), hepatitis C virus (HCV), human T lymphotropic virus-type 1 (HTLV-1) and syphilis in 129 human immunodeficiency virus-type 1 (HIV-1) infected patients.

Infection	Prevalence (%)
HBV	48 (37)
HCV	0 (0)
HTLV-1	6 (5)
Syphilis	26 (20)

Table 2: Distribution of serological markers for hepatitis B virus (HBV), human T lymphotropic virus-type 1 (HTLV-1) and syphilis in 129 human immunodeficiency virus type-1 (HIV-1) infected patients.

Serologic marker	Prevalence (%)
anti-HBc	38 (31)
HBsAg	19 (15)
anti-HTLV-1	6 (5)
Reactive syphilis serology	26 (20)
anti-HBc and syphilis	10 (8)
HBsAg and syphilis	3 (2)
anti-HTLV-1 and syphilis	0 (0)
Negative	70 (54)

Table 3: Gender distribution of serologic markers of hepatitis B virus (HBV), human T lymphotropic virus-type 1 (HTLV-1) and syphilis in human immunodeficiency virus -type 1 (HIV-1) infected patients.

Infection	Prevalence (%) Male (n = 49)	Female (n = 80)	p value*
HBV	24 (50)	17 (21)	0.005
Syphilis	13 (27)	12 (15)	NS
HBV and syphilis	7 (14)	5 (6)	NS
HTLV-1	0 (0)	5 (6)	NS

*NS = not significant

Table 4: Age distribution of serological markers of hepatitis B virus (HBV), human T lymphotropic virus-type 1 (HTLV-1) and syphilis in human immunodeficiency virus-type 1 (HIV-1) infected patients.*

Age group/years (n)	Prevalence (%) HBV	Syphilis	HTLV-1
20 - 30 (24)	8 (33)	3 (13)	2 (8)
31 - 40 (29)	12 (41)	3 (10)	2 (7)
41 - 50 (13)	6 (49)	5 (40)	0 (0)
51 and over (18)	6 (33)	5 (30)	1 (6)

*The prevalence of syphilis was significantly higher in patients older than 40 years of age (10/31, 32% v 6/53, 11%; p = 0.05). Age was ascertained in 84/129 patients.

DISCUSSION

High rates of co-infection with other bloodborne STI in HIV-1-infected patients are well documented (17). Nonetheless, the present study provides data on the potential for co-transmission of the STI pathogens. This has implications for the natural history of HIV-1 infection and for the outcome of therapy of HIV/AIDS.

If a patient has hepatic dysfunction from underlying liver infection, this increases the likelihood of hepatic side effects of highly active antiretroviral therapy (HAART) (3,6). For example, infection with HCV is known to be a major contributor to morbidity and mortality in patients infected with HIV (3). Studies conducted elsewhere indicate that 30-50% of patients with HIV are co-infected with HCV (3). Whereas antiretroviral therapy has improved life expectancy in HIV/AIDS patients, HCV-induced liver disease has emerged as a leading cause of morbidity and death in this population (3,6). The observed low prevalence of HCV in this group of patients reflects the low prevalence of HCV in the general Jamaican population (18,19). If the absence of HCV from the HIV-1 infected cohort in our study holds true in general, this would signal a distinct advantage for the management of Jamaican patients with HIV/AIDS.

The HBV seroprevalence rate of 37% observed in this cohort of HIV-1-infected patients is almost three times that reported in the general Jamaican population and surpasses that found in other high risk groups (18-21). The seroprevalence of HBV in the HIV-1-infected men observed in this study is similar to that reported in HIV-1-infected men in developed countries (22). One of the more disturbing observations of this study is the high proportion of patients with active/chronic HBV infection. The test for total anti-HBc is invariably positive when HBsAg is present in a clinically ill patient and can be used to validate the HBsAg reaction (23). More than half of the HIV-1-infected patients with active/chronic HBV infection, indicated by HBsAg positivity, tested negative for anti-HBc antibody. The reason for this unusual HBV result is not clear; however, the course of HBV infection and the host immune response to HBV

may be modified in HIV-infected patients with immune deficiency (24). The scope of this study did not allow for repeat testing, detection of other HBV markers and performance of liver function tests to assess chronicity, infectivity or carrier status of HBV infection in the patients. It is known from other studies that chronic viral hepatitis is one of the risk factors for severe hepatoxicity in HIV-1-infected patients treated with non-nucleoside reverse transcriptase inhibitors (NNRTIs) including nevirapine (NVP) and efavirenz (EFV), so this problem might be anticipated in the subset of our patients who are carriers of hepatitis B (7). From another perspective, some antiretroviral drugs, including HAART, may induce mutations in HBV conferring resistance to drugs such as lamivudine (3TC) (10). One might anticipate, then, that the patients in this series who are co-infected with HBV and HIV may lose the potential benefit of lamivudine if treated with these antiretrovirals. Previous studies in Jamaicans reported current HBV infection in 1-6% of high risk groups (18,19).

The prevalence rate and gender distribution of HTLV-1 found in the HIV/AIDS population are roughly comparable with those found in the general Jamaican population, although it is surprising that not even one male patient with HTLV-1 was found in the series (20,26). The potential adverse consequences of HTLV-1 co-infection in HIV/AIDS patients are of particular concern to HTLV-1 endemic areas such as Jamaica. Some studies suggest that HIV-1 co-infection upregulates HTLV-1/11 expression and disease manifestations while others indicate that HTLV-1 infection adversely affects the acquisition and clinical course of HIV-1 infection (11,15). The clinical course in Jamaicans co-infected with these two retroviruses should be followed keenly.

The seroprevalence of syphilis in this cohort of HIV-1-infected patients is unexpectedly high despite the well known association between syphilis and HIV infection (1,17). The 20% seroprevalence of syphilis observed is several-fold greater than that found in the general population and high-risk groups in Jamaica (20). This suggests that, at least in this cohort, the HIV-1-infected group constitutes an important reservoir. This could have implications for further spread of syphilis at a time when the health authorities are optimistic about bringing this disease under control.

In conclusion, the sequelae of syphilis and chronic HBV infection should be carefully surveyed in HIV/AIDS patients in Jamaica. Co-infection with other bloodborne STI should be seriously considered among the factors likely to complicate the management of patients with HIV/AIDS in Jamaica.

REFERENCES

1. Fleming DT, Levine WC, Trees DL, Tambe P, Toomey K, St Louis ME. Syphilis in Atlanta during an era of declining incidence. Sex Transm Dis 2000; **27**: 68-73.
2. Thami GP, Kaur S, Gupta R, Kanwar AJ, Sood S. Syphilitic panuveitis and asymptomatic neurosyphilis: a marker of HIV infection. Int J STD AIDS 2001; **12**: 754-6.
3. Dodg M, Tavil AS. Hepatitis C and human immunodeficiency virus coinfections. J Clin Gastroenterol 2001; **33**: 367-74.
4. Santolamazza M, Delle Monache M, Alvino A, Bacosi M, D'Innocenzo S, Ciervo U et al. Multiple viral infections in a group of intravenous drug users: hepatitis B virus exposure is the risk factor. Eur J Gastroenterol Hepatol 2001; **13**: 1347-54.
5. Sud A, Singh J, Dhiman RK, Wanchu A, Singh S, Chawla Y. Hepatitis B virus co-infection in HIV infected patients. Trop Gastroenterol 2001; **22**: 90-2.
6. Monga HK, Rodriquez-Barradas MC, Breauz K, Khattak K, Troisi CL, Velez M et al. Hepatitis C virus infection-related morbidity and mortality among patients with human immunodeficiency virus infection. Clin Infect Dis 2001; **33**: 240-7.
7. Sulkowski MS, Thomas DL, Mehta SH, Chaisson RE, Moore RD. Hepatotoxicity associated with nevirapine or efavirenz-containing antiretroviral therapy: role of hepatitis C and B infections. Hepatology 2002; **35**: 182-9.
8. Wit W, Weverling GJ, Weel J, Jurriaans S, Lange JM. Incidence of and risk factors for severe hepatotoxicity associated with antiretroviral combination therapy. J Infect Dis 2002; **186**: 23-31.
9. Pouti M, Airoldi M, Bruno R, Zanini B, Spinetti A, Pezzoli C et al. Hepatitis B virus co-infection in human immunodeficiency virus-infected subjects. AIDS Rev 2002; **4**: 27-35.
10. Wolters LM, Niesters HG, Hansen BE, van der Ende ME, Kroon FP, Richter C et al. Development of hepatitis B virus resistance for lamivudine in chronic hepatitis B patients co-infected with the human immunodeficiency virus in a Dutch cohort. J Clin Virol 2002; **24**: 173-81.
11. Szabo J, Beck Z, Csoman E, Liu X, Andriko I, Kiss J et al. Differential patterns of interaction between HIV type 1 and HTLV type 1 in monocyte-derived macrophages cultured in vitro: implications for in vivo coinfection with HIV type 1 and HTLV type 1. AIDS Res Hum Retroviruses 1999; **15**: 1653-66.
12. Cesaire R, Dehee A, Lezin A, Desire N, Bourdonne O, Dantin F et al. Quantification of HTLV type 1 and HIV type 1 DNA load in coinfected patients: HIV type 1 infection does not alter HTLV type 1 proviral amount in the peripheral blood compartment. AIDS Res Hum Retroviruses 2001; **17**: 799-805.
13. Pierik LT, Murphy EL. The clinical significance of HTLV-1 and HTLV-11 infection in the AIDS epidemic. AIDS Clin Rev 1991; **1**: 39-57.
14. Hishida O, Ayisi NK, Aidoo M, Brandful J, Ampoto W, Osei-Kwasi M et al. Serological survey of HIV-1, HIV-2 and human T-cell leukemia virus type 1 for suspected AIDS cases in Ghana. AIDS 1994; **8**: 1257-61.
15. Chavance M, Neisson-Vernant C, Quist-Monplaisir N, Armenguad B, Chout R. HIV/HTLV-1 coinfection and clinical grade at diagnosis. J Acquir Immune Defic Syndr Human Retrovirol 1995; **8**: 91-5.
16. Beilke MA, Japa S, Vinson DG. HTLV-1 and HTLV-11 virus expression increase with HIV-1 coinfection. J Acquir Immune Defic Syndr Hum Retrovirol 1998; **15**: 391-7.
17. Rodriquez OES, Gil MLM, Santana JFH, Canal JML, Sanchez AMM. Prevalence of serologic markers of HBV, HDV, HCV and HIV in non-infection drug users compared to infection drug users in Gran Canaria, Spain. Eur J Epidemiol 1998; **14**: 551-61.
18. King SD, Dodd RY, Haynes G, Wynter HH, Sullivan MT, Serjeant GR et al. Prevalence of antibodies to Hepatitis C virus and other markers in Jamaica. West Indian Med J 1995; **44**: 55-7.

19. Barton EN, King SD, Douglas LL. The seroprevalence of hepatitis and retroviral infection in Jamaican haemodialysis patients. West Indian Med J 1998; **47**: 105-7.
20. Dowe GD, Smikle MF, Thesiger C, Williams EM. Bloodborne sexually transmitted infections in patients presenting for substance abuse treatment in Jamaica. Sex Trans Dis 2001; **28:** 266-9.
21. Smikle MF, Dowe G, Williams EM, Thesiger C. Antibodies to hepatitis B virus and hepatitis C virus in residential detoxification clients in Jamaica. Hum Antibodies 2000; **9**: 231-3.
22. Busch MP, Dodd RY, Lackritz EM, AuBuchon JP, Birkmeyer JD, Petersen LR. Value and cost-effectiveness of screening blood donors for antibody to hepatitis B core antigen as a way of detecting window-phase human immunodeficiency virus type 1 infections. The HIV blood donor study group. Transfusion 1997; **37**: 1003-11.
23. Hollinger FB and Dienstag JL. Hepatitis B and D viruses, In: Manual of Clinical Microbiology, PR Murray, JE Baron, MA Pfaller, FC Tenouer, RH Yolker, eds, American Society for Microbiology, Washington, DC; 1999:1025.
24. Homann C, Krogsgaard K, Pedersen C, Andersson P, Nielsen JO. High incidence of hepatitis B infection and evolution of chronic hepatitis B infection in patients with advanced HIV infection. J Acquir Immune Defic Syndr 1991; **4**: 416-20.
25. Figueroa JP. Heterosexual transmission of HTLV-1: epidemiological aspects. West Indian Med J 1996; **45**: 4-8.