

## PREVALENCE OF ANTIBODIES TO HEPATITIS C VIRUS IN POPULATIONS AT LOW AND HIGH RISK FOR SEXUALLY TRANSMITTED DISEASES IN RIO DE JANEIRO

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*In order to investigate the sexual transmission of the Hepatitis C Virus (HCV), the prevalence of specific antibodies in populations at high and low risk for sexually transmitted diseases (STDs) was evaluated. The population at low risk for STDs was composed of persons who voluntarily donated blood at the Hospital Universitário Clementino Fraga Filho (HUCFF) between July and November, 1990 (n = 2494). The population at high risk for STDs was drawn from an ongoing study on the natural history of Human Immunodeficiency Virus (HIV) infection (n = 210, 187 with sexual risk factors for HIV infection). All samples were screened using a first generation ELISA. Repeat reactive samples were then tested in a second generation RIBA. For all ELISA positive samples, two sex and age-matched ELISA negative controls were selected. Data pertaining to the presence of antibodies to the Hepatitis B core antigen (anti-HBc antibodies) and to Treponema pallidum were abstracted from the medical records. The prevalence of RIBA 2 confirmed HCV infection among the blood donors was 2.08%, which is well above the reported prevalence in similar populations from developed western countries. Among the HIV infected homosexuals, the encountered prevalence was 7.96% (p < 0.0005). For the whole group with sexually acquired HIV infection, the prevalence was 8.02% (p < 0.000005). Anti-HBc antibodies were more frequently present in anti-HCV RIBA-2 confirmed positive blood donors than in controls (p < 0.001). 33.3% of the HCV-positive blood donors and 11.04% controls were found to be anti-HBc positive (p < 0.0005). As for the FTA-ABs, 17.6% HCV-positive donors and 4.9% controls were positive (p < 0.01). 5.9% samples from blood donors were both anti-HBc and FTA-ABS positive, whereas none of the controls reacted in both tests (p < 0.05). The association between HCV, Hepatitis B infection and syphilis in individuals at low risk for parenterally transmitted diseases suggests that sexual transmission contributes to the maintenance of the endemicity of HCV in the local population.*

Key words: Hepatitis C – sexually transmitted diseases – HIV – Brazil

Soon after the development of the first serological assay for the detection of antibodies against Hepatitis C Virus (HCV), its etiological role in post-transfusional Non-A Non-B Hepatitis, cirrhosis and hepatoma was demonstrated (Zuckerman, 1990). Further studies revealed a high prevalence of anti-HCV antibodies in hemophiliacs, intravenous drug users

and other groups at risk for parenterally transmitted infections (Alter, 1991).

Several published reports have investigated the possible sexual transmission of HCV. The vast majority of these utilized only first generation ELISA assays, no complementary or confirmatory tests being performed (Alter, 1991). Due to the conflicting results obtained, the efficacy of sexual transmission and its role in the maintenance of the endemicity of HCV remain a matter of dispute (Alter, 1991). Nevertheless, in a study performed in Japan (Tajima et al., 1991), using the more sensitive and specific second generation assays (Van der Poel

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et al., 1991), the prevalence of anti-HCV antibodies was significantly higher in sexual contacts of HCV-infected individuals than in the control group. The authors suggested that sexual transmission plays a central role in the maintenance of the infection in that community (Tajima et al., 1991).

Other studies have demonstrated that the prevalence of anti-HCV antibodies is higher in blood donors in Asia, Africa and Arab countries than in western countries (Saeed et al., 1991; Tibbs et al., 1991). In the US, HCV infection is commoner in ethnic minorities and other economically deprived groups than in the more affluent white community (Alter et al., 1990; Stevens et al., 1990). These patterns are also observed for hepatitis B, being associated with living conditions in each country.

A computerized search of Medline until March 1992 did not reveal a single publication concerning HCV infection in Latin America. Hence, the epidemiology of this infection is presently unknown in Central and South America.

With a view to investigate the prevalence and sexual transmission of HCV in Rio de Janeiro, Brazil, individuals at low and high risk for sexually transmitted diseases (STDs) were studied using a second generation confirmatory test. Association between the presence of serological markers of STDs and anti-HCV antibodies in the low risk population was also investigated.

#### METHODS

The group considered to be at low risk for STDs and blood borne infections was composed of 2494 consecutive individuals who donated blood at Hospital Universitario Clementino Fraga Filho (HUCFF) between July and November 1990. At the Blood Bank at HUCFF all donations are voluntary and unpaid and all donors are submitted to direct questioning by a trained nurse or physician concerning risk factors for STDs and blood borne infections. The high risk group was composed of 187 adult patients consecutively enrolled between September 1990 and January 1991 in a cohort study of the natural history of HIV infection. All had confirmed HIV infection and denied parenteral risk factors for HIV infection.

All sera were screened with a first generation HCV ELISA test (Ortho Diagnostics,

Raritan, NJ). All reactive sera were further probed with a second generation recombinant immunoblot confirmatory test (RIBA-2, Ortho Diagnostics, Raritan, NJ). RIBA-2 results were interpreted according to the manufacturer's instructions.

For each HCV-ELISA positive blood donor, two controls were selected. These were the first two subsequent donors of the same sex and age (within five years) who were HCV-seronegative. Results on serum antibodies to hepatitis B core antigen (anti-HBc, Abbott, Chicago, Il), VDRL and HIV serology (Abbot, Chicago, Il) were abstracted from the Blood Bank records. Samples from HCV-ELISA positive blood donors and their controls were also tested for antibodies to *Treponema pallidum* by FTA-ABs (BIOLAB, Rio de Janeiro, Brasil), according to the manufacturer's instructions.

The Chi-square test was used to evaluate the statistical significance of the differences in antibody prevalence between groups. When indicated, Fisher's exact test was applied.

#### RESULTS

All samples from the blood donors were VDRL and HIV-negative. Of 2494 samples tested, 82 (3.28%) were HCV ELISA positive. When these were subjected to the confirmatory test (RIBA-2), 51 were found to be positive, 4 indeterminate and 26 negative, for a confirmation rate of 62.2%. Thus, the encountered prevalence of HCV infection was 2.04% (.95 C.I. = 1.49-2.59), no differences being found between first time and repetitive donors (data not shown).

Seventeen of the fifty one (33.3%) RIBA-2 confirmed HCV-positive blood donors and 18/163 (11.04%) controls were found to be anti-HBc positive ( $p < 0.0005$ ). As for the FTA-ABs, 9 (17.6%) HCV positive donors and 8 (4.9%) controls were positive ( $p < 0.01$ ). Three (5.9%) samples from HCV-positive blood donors were both anti-HBc and FTA-ABS positive, whereas none of the controls reacted in both tests ( $p < 0.05$ ). Overall, 23 (45.1%) HCV-positive blood donors and 26 (15.9%) controls were anti-HBc and/or FTA-ABS positive ( $p < 0.00005$ ).

Of 187 HIV infected individuals (113 homosexuals and 74 heterosexuals), 28 were HCV

ELISA positive. Of these, 15 (9 homosexuals, 6 heterosexuals) were RIBA-2 confirmed, for a prevalence of confirmed infections of 8.02% (7.96% in homosexuals, 8.11% in bisexuals), which is significantly higher than the encountered prevalence in blood donors ( $p < 0.000005$ ). The prevalence of HCV infection was comparable among patients with symptomatic and asymptomatic HIV infection (data not shown).

#### DISCUSSION

The prevalence of RIBA-2 confirmed HCV infection in HIV infected individuals was found to be significantly higher than in the blood donor population. When two groups of blood donors were analyzed, markers of STDs (anti-HBc and FTA-ABs) were significantly more common in the HCV positive group than in the controls. Since all these individuals (blood donors and HIV infected patients alike) were at low risk for parenterally acquired infections, these findings, as a whole, further reinforce the notion of the sexual transmissibility of HCV.

The encountered prevalence (2.04%) of RIBA-2 confirmed HCV infection in blood donors at low risk for STDs and blood borne infections is 10-20 times higher than that reported in similar studies performed in industrialized western countries (Follett et al., 1991; Menitove et al., 1990). Previous reports have demonstrated that there is an inverse relationship between affluence and prevalence of HCV infection, as is the case for Hepatitis B and other sexually transmitted diseases (Alter et al., 1990). The high prevalence of HCV infection in blood donors herein reported probably reflects the low socio-economic level of the population studied. It is unlikely that levels of endemicity as high as the one reported in the present study could be ascribed to parenteral transmission, especially in populations at low risk for blood borne infections, as is the case of the blood donors.

Given the likelihood of sexual transmission, HCV should probably be included in the still growing list of STDs. Accordingly, HCV infected individuals should receive orientation

as to the risk of sexual transmission of this potentially serious viral infection.

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