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Original Article

# Frequency of Human T-Cell Lymphotropic Virus (HTLV) Type 1 and 2 Infection in HIV Infected Patients

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**ABSTRACT**

***Background and Objectives:*** Human T-cell lymphotropic viruses (HTLV) type 1 and 2 are retroviruses that share the same routes of transmission as human immunodeficiency virus (HIV). As a consequence of epidemiologic similarities, HIV and HTLV-1/2 co-infection is frequent. Due to the limited data, this study assessed the seroprevalence of HTLV-1/2 infections in HIV infected patients in Tehran, Iran.

***Materials and Methods:*** This case-control study was carried out in 180 HIV infected patients from Iranian HIV/AIDS Research Center in Tehran and 117 matched healthy controls. The serum samples were checked with enzyme-linked immunosorbent assay (ELISA) for anti HTLV-1/2.

***Results:*** A total of 180 HIV positive patients with mean age 36.9±9.2 years and 117 matched controls were enrolled in the study. All cases and controls were negative for HTLV-1/2 infection.

***Conclusion:*** HTLV-1/2 infection is negligible in HIV infected patients in Tehran, Iran, although intravenous drug use is the most common route of HIV transmission in our study subjects.

***Key words:*** HTLV-1**,** HTLV-2**,** Human Immunodeficiency Virus (HIV)

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## Introduction

It is estimated that 10-20 million people are infected by human T-cell lymphotropic virus type 1 and 2 (HTLV-1/2) worldwide, which are geographically confined in specific areas such as Japan, the Caribbean, Sub-Saharan Africa, and South America (1, 2).

More than 33 million people worldwide are infected with human immunodeficiency virus (HIV) (3). HTLV and HIV share similar routes of transmission including blood transfusion, intravenous drug use (IDU), sexual contact with multiples partners and breast feeding (4-6). Due to these epidemiologic similarities, HIV and HTLV-1/2 co-infection is frequent (7).

Co-infection by HIV/HTLV-2 is more frequently reported in the USA and Europe, whereas HIV/HTLV-1 co-infection predominates in South America, the Caribbean and Africa (8, 9). This pattern follows the geographical distribution of HTLV-1/2 infections in different areas (10).

HTLV-1 is a human retrovirus that is associated with adult T-cell leukemia and with a slowly progressive neurologic disorder; HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP). Most of HTLV-1 infected persons are asymptomatic and only a minority of them develops symptoms of disease (11, 12).

The role of HTLV-2 as an etiologic factor in disease development remains unclear, although some studies reported association of this virus with higher risk of HAM/TSP, inflammatory or bacterial diseases and higher mortality (13, 14).

The HTLV-1 has tropism for $CD4^+$ T-cells, although other lymphocytes can also be infected by the virus, while HTLV-2 is predominantly tropic for $CD8^+$ T-cells (15).

In contrast to endemic countries, prevalence of HTLV-1 infection is very low in general population in Iran (0.02%) (16). This infection is more prevalent among HIV infected patients in some regions of Iran especially in IDUs (17).

To our knowledge, to date, few studies have been carried out on the prevalence of HTLV-1/2 infection in the Iranian HIV-infected patients. The aim of the present study was to assess this prevalence in the cohort of HIV-infected patients in Tehran, Iran.

## Materials and Methods

In this case-control study, 180 HIV positive patients referred to Iranian Research Center for HIV/AIDS in Tehran, Iran and 117 healthy controls were enrolled. Controls were matched with cases regarding sex and age. Informed consent was obtained from all patients. A questionnaire that gathered epidemiological and clinical data was completed by clinicians. The study was approved by Iranian Research Center for HIV/AIDS Ethics Committee.

HIV-antibody was determined by ELISA (MP Biomedicals, Illkirch, France); with positive tests confirmed by Western blot assay (Diaplus, San Francisco, USA). All assay protocols, cut-offs, and result interpretations were carried out according to the manufacturers' instructions.

$CD4^+$ count was determined by flowcytometry and defined as cells/$mm^3$. All patients were tested for HBsAg, anti-HBs and hepatitis C antibody (anti-HCV) by ELISA. The commercial enzyme immunoassay kits used were as follows: HBsAg and anti-HBs (Hepanosticka Biomerieux, Boxtel, The Netherlands) and anti-HCV (Biorad, Segrate, Italy). Recombinant immunoblot assay (RIBA Innogenetics, Ghent, Belgium) was employed to confirm anti-HCV reactivity.

All patients were tested for anti-HTLV-1/2 using ELISA (Dia. Pro Diagnostic, Bioprobes, Milan, Italy).

**Statistical Analysis**

The Chi-square and $t^2$-tests were used with the SPSS 13 Package program for statistical analysis (Chicago, IL, USA). Data are presented as mean ± SD or, when indicated, as an absolute number and percentage.

## Results

A total of 180 HIV positive patients with mean age 36.9±9.2 (range: 9-67) years and 117 healthy controls with mean age 37.8±9.4 years were enrolled in the study. 69.6% of patients were male and 30.4% were female. The mean $CD4^+$ count of patients was 275.6±181 (16-1000) cells/$mm^3$. The possible routes of HIV transmission were intravenous drug use (53.6%), heterosexual contact (28.7%), infected blood and blood products transfusion (2.8%), vertical transmission (1.1%), tattooing (0.6%), IDU and tattooing (0.6%), heterosexual contact and intravenous drug use (4.4%), heterosexual contact and infected blood (0.6%) and in 7.6% the route of HIV acquisition was not identified. Co-infection with HCV and HBV occurred in 50.3% and 5% of patients respectively. HBV/ HCV co-infection was observed in 2.2% of cases. VDRL was positive in 3.9% of patients. Anti-HBs was positive in 35.4% of cases.

HTLV-1/2 infection was not detected in any of the patients and controls. All negative samples underwent confirmatory testing with additional ELISA test, and again all samples were negative for HTLV-1/2 antibodies.

## Discussion

In this study, the rate of HTLV-1/2 infection was determined in Iranian HIV-positive patients. Our survey showed that HTLV-1/2 infection was negligible in HIV infected patients in Tehran, Iran regardless of age, sex, CD4 count, route of transmission and HBV and HCV co-infection.

HTLV-1 and 2 are retroviruses that have same transmission routes as HIV so HTLV/ HIV co-infection is common. However, prevalence rates of co-infection are different in distinct populations and geographical areas. HTLV-2 is more frequently found in the Northern hemisphere, while HTLV-1 being more prevalent in HIV infected individuals in the Southern hemisphere (7).

HTLV-1 infection is currently restricted to endemic areas. Middle East surveys have been largely negative with the exception of northeastern part of Iran (Mashhad) (18). Prevalence of HTLV-1 infection is very low in general population in Iran (0.02%). The rates of HIV/HTLV co-infection also vary with the geographic location, and follow a similar distribution to HTLV (16).

In a survey in Iranian tissue donors, about 1.61% of 1548 tissue donors were HTLV positive (19). Whereas, Khameneh *et al.* found only 1 patient with positive anti-HTLV-1 in 91 renal transplant recipients from Urmia (20).

The prevalence of HTLV-1 infection in 28926 blood donors in Mashhad was 0.77%, which shows the city of Mashhad is an endemic area (21). The rate of HTLV-1 found in Mashhad blood donors is greater than that seen in similar studies in the United States (0.004%), France (0.004%), and Brazil (0.42%). Higher seroprevalence in blood donors has been found in Jamaica (2.1%) (22).

In a study in South of Iran (Ahwaz), HTLV-1 infection was highly prevalent among HIV infected IDU patients (16.33%). Frequency of HTLV-1 infection in HIV positive IDUs was higher than HIV negative cases. HTLV-1/ HCV/HBV co-infection in HIV infected IDU patients was reported 8.65% in this study (17).

In another case-control study in Iran in 150 clinically and histopathologically proven

Mycosis Fungoides (MF) patients and 150 normal controls, only three MF patients had HTLV-1 infection, whereas two cases of normal subjects had the infection. Seropositive MF patients were male and from northeastern part of Iran (23).

Our study showed no evidence of HTLV-1/2 infection in HIV positive patients. It may be due to low rate of HTLV infection in Tehran, as we also observed in our healthy control group. An epidemiological characteristic of HTLV infection is the difference in seroprevalence rates according to the geographical area and the sociodemographic composition of the population (24). As mentioned above, the prevalence of HTLV-I infection is very low in general population in Iran, with the exception of northeastern part of Iran.

## Conclusion

HTLV-1/2 infections are negligible in HIV infected patients in Tehran, Iran, although intravenous drug use is the most common route of HIV transmission in our study subjects. However, further studies are necessary to determine HTLV prevalence in HIV infected patients and to measure the real extension of this infection.

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