

Serologic Prevalence of Human T-Lymphotropic Virus (HTLV) among major Thalassemic Patients in Kermanshah 2010

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Abstract

Introduction: Transfusion-transmitted infections (TTI) continue to be a major challenge for Blood transfusion organizations in the world and multi- transfused patients (MTPs) are at higher risk of infection. HTLV-1 is a retrovirus that easily transmitted via blood cell products. The aim of this study is determine the seroprevalence of HTLV-1 in major thalassemic patients from Kermanshah Province, western of Iran.

Material and methods: A total of 116 serum samples from all major thalassemic patients that exist in Kermanshah province and 1000 serum samples from healthy individuals as control group were tested for HTLV specific antibody by ELISA method. All of the ELISA positive samples were confirmed by Western Blotting analysis.

Results: From major thalassemic patients, 4 subjects (3.4%) had HTLV-I infection. Also, among 1000 control individuals, 5 subjects (0.5%) had HTLV-I infection. There wasn't any HTLV-II in major thalassemic patients or control individuals.

Conclusion: our results showed this infection exist in our region. These results indicated that screening procedure were not doing carefully. More studies are needed to clarify the reason of this unsuccessfully screening of this virus from donated blood.

Key words: Transfusion-transmitted infections, Human T-lymphotropic virus, Multi transfused patients, major thalassaemia.

Introduction

Transfusion-transmitted infections (TTI) continue to be a major challenge for Blood transfusion organizations in the world. This problem is more serious in the developing countries with lower economic means. The most important viral infections that transmitted in blood transfusion are Hepatitis viruses (including Hepatitis A, B and C viruses) and Retroviruses (including Human immunodeficiency virus and Human T-cell leukemia virus type I & II).(1)

Human T-lymphotropic virus type 1 (HTLV-I) is a retrovirus that infects T-cell, is easily transmitted via blood cell products such as whole blood, packed cells, and platelets. However, infection has not been

reported in patients who received fresh frozen plasma, cryoprecipitate or coagulation factor concentrates.(2) HTLV-I is not a ubiquitous virus, but its geographical distribution is mainly restricted to some areas of high endemicity, including sub-Saharan Africa, Southern Japan, Central and South America, and some regions of the Middle East and Melanesia,(3) and in these areas, seroconversion has been observed in 44%-63% of cases after receiving blood contaminated with HTLV-I infected cells.(4) Also, in rare cases, adult T-cell leukemia has been observed after receiving this virus.(2)

Multi transfused patients (MTPs) are at higher risk of infection and studies of infection in these patients

can be a useful index for examining the blood safety filters in place.(1) Among MTPs, major thalassemic patients are the highest risk group for HTLV-I infection due to their need for frequent blood transfusion.(5- 10) In Iran, there are several studies from different regions that indicate vary prevalence of HTLV-I infection in thalassemic patients,(2, 10- 12) but there isn't any data about prevalence of this infection in western of Iran. These evidences, might suggest that HTLV-I infection could be present in other areas of Iran such as Kermanshah.

The aim of this study is determine the seroprevalence of HTLV-I in major thalassemic patients from Kermanshah Province, western of Iran.

Material and methods

A total of 116 serum samples from all major thalassemic patients that exist in Kermanshah providence were tested for HTLV specific antibody in September 2011. Also, in order to determine the prevalence of HTLV infected cases in healthy population as the control group, all the blood donated (1000 samples) to the Kermanshah Blood Transfusion Organization in July to October 2011 were tested. The serum samples of patient and control individuals was separated from their whole blood and kept frozen at -20°C. At the time of blood sampling, a questionnaire was filled for each patient containing the demographic and other required data for this study. All of which were primarily assessed by the Microelisa assay (Vironostika HTLV I, II Organon). The test detects HTLV infection without distinguishing between HTLV-I and HTLV-II. All of the ELISA positive samples were confirmed by Western Blotting analysis (WB; HTLV blot 2.4 kit; Gene Labs Diagnostics, Ltd), which can confirm ELISA positive results, besides the distinguishing HTLV-I from HTLV-II. The SPSS software package version 20 was used for the statistic alanalysis by descriptive statistics and Fisher Exact test to compare the groups.(2, 12)

Results

From 116 major thalassemic patients, 64 (55.1%) patients were male and 52 (44.8%) patients were female with a mean age of 16.8±6.6 years old. Of 1000 control individuals, 416 (41.6%) individuals were male and 584 (58.4 %) were female with a mean age of 43.1±19.8 years old. From major thalassemic patients, 4 subjects (3.4%) showed positive results in Elisa test HTLV antibody. Also, Elisa test showed that out of 1000 control

individuals, 8 subjects (0.8%) were HTLV antibody positive. All the positive samples were evaluated by Western blotting. All of 4 positive results in Elisa test were confirmed for HTLV-I. Also, results of Western blotting test showed that 5 of the 8 (62.5%) control samples were HTLV-I but 3 (37.5%) sample was not confirmed. In totally, 9 (0.8) individuals had HTLV-I infection (Table- 1). This infection had higher prevalence in thalassemic patients in compare the control group and this difference was statistically significant (P= 0.009). In the major thalassemia group, male had higher frequency of this infection but there was no significant different between HTLV seropositivity and gender of the patients (P> 0.05). There were no significant differences between HTLV infection and other data. In this study, there is not found any HTLV-II in both thalassemic and control group.

Discussion

TTI therefore continue to be a serious problem in underdeveloped areas and less serious in developing areas of the world. MTPs are at a particularly increased risk. Knowledge of the prevalence of TTI among MTPs in developing countries is an appropriate indicator of the risk of TTI (1).

Among TTI agents, Assessment of the prevalence of HTLV is important because the prevalence of this virus is considerable (around 1%) in endemic areas and there is a probability of its transmission via transfusion which could in some cases result in malignancies. This infection is endemic in certain parts of the world (2).

The results of this study showed that 3.4% of thalassemic patients had HTLV-I infection and in compare to control group showed higher prevalence. These results are similar to other reports carried out both in Iran and other parts of the world (Italy) 4.8% (13), Shiraz (Iran) 3.12% (14), Hormozgan (Iran) 3.7% (15) and Gorgan (Iran) 4.4% (16). In contrast, in Shiraz, 25.6% of thalassemic patients were seropositive for anti-HTLV-I antibody (17) and this frequency is so higher than present study.

Table- 1. Result of infection in thalassemis and control group.

	Major thalassemia	Control	Total
Sex (male/female)	64/52	416/584	480/636
Positive ELISA test (male/female)	4 (3/1)	8 (0/8)	12 (3/9)
Positive Western blotting (male/female)	4 (3/1)	5 (0/5)	9 (3/6)

Although, Polymerase Chain Reaction (PCR) is the most accurate method for confirming the presence of HTLV,(17, 18) it is not applicable to all cases due to its high costs and unavailability. Thus, it is better that this method be used just for the borderline cases. ELISA method can detect HTLV infection without distinguishing between HTLV-I and HTLV-II. This method is rapid, easy and has high sensitivity and it can be useful for screening the donated blood in a large number. For confirm the result of ELISA test and differentiation between HTLV-I from HTLV-II we used Western blotting analysis.(2) Our Western blotting results did not show any HTLV-II. In confirm to our results, Karimi and et al. reported that there wasn't any HTLV-II in their study. In contrast; Abbaszadegan and et al. were reported 4.82% of HTLV detected by ELISA were HTLV-II.(12)

Screening of donated blood for anti-HTLV-I, II in Iran was started in 1995,(19) but the results of present study and other similar study in Iran that indicates high prevalence of this infection in MTPs, shows this screening is not completely successful. This issue can have several reasons such as errors in each pre-analytical, analytical and post analytical laboratory screening tests. All blood donations must be accurately studied for the presence of HTLV. More studies are needed to clarify the reason of this unsuccessfully screening of this virus from donated blood.

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