

Investigating the prevalence of HTLV and HCV infection in blood donors (for the first time) in blood transfusion organization of Kermanshah, Iran

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Abstract

Aim: blood transfusion is one of the most effective ways of HTLV and HCV transmission, so routine screening of blood donors is essential to reduce the risk of transmission. HCV virus is associated with liver cirrhosis, hepatocellular carcinoma, and non-Hodgkin lymphoma and HTLV virus is associated with diseases of ATL, HAM / TSP and HAU. As these viruses have high prevalence in Iraq, in the neighborhood of Kermanshah, it is essential to conduct a study on the prevalence of this virus among blood donors in Kermanshah to increase the safety of blood transfusion. Material and Method: In this study, 470 blood donors referred for the first time to blood transfusion organization were randomly selected and they were examined through ELISA screening test and Western confirmatory test for HTLV and ELISA screening test and RIBA confirmatory test for HCV virus. Demographic data were separately recorded in each individual file. Results were statistically analyzed using SPSS 16 software. Results: 90% of blood donors were male and 10% of them female. Most of them (42.1 percent) were in the age group of 20-29 years. Only one case (0.2%) had positive result by ELISA method for HTLV, but it became negative by Western blot method and one person (0.2%) had positive result by using ELISA method and RIBA confirmatory test for HCV. Discussion: according to the results of this study, it seems that the prevalence of HTLV and HCV is not high among blood donors in Kermanshah. However, due to need to prevent the transmission of infection through blood transfusion, screening the blood donors with high-risk behavior (having Tattoo, having multiple sexual partners, intravenous administration of drugs, surgery) in terms of HTLV and screening all blood donors in terms of HCV are recommended.

Keywords

Prevalence; Blood Transfusion; HTLV; HCV; Kermanshah

DOI: 10.4328/JCAM.5540 Received: 25.11.2017 Accepted: 26.11.2017 Printed: 01.10.2017 J Clin Anal Med 2017;8(suppl 5): 509-12
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Introduction

Due to high viral load transmission, blood transfusion is one of the effective methods of viral infection such as HTLV and HCV [1,2]. Therefore, thalassemia and hemophilia patients receiving blood frequently are at risk of infection by these viruses [3]. Routine screening of blood donor is essential in terms of Antibody, HTLV, and HCV in endemic areas to reduce the risk of transmission [4] HCV virus has affected nearly 130 million people in the world [5] and it plays pathological role in patients with liver cirrhosis, hepatocellular carcinomas, and non-Hodgkin lymphoma (NHL) [6, 7]. Researchers in various studies have suggested that HCV infection due to lack of vaccine can have the highest rate of the prevalence compared to other viruses transmitted through blood among people with regular blood transfusions. Therefore, the most effective way to prevent its transmission is proper screening of blood donors [8, 9, 10,11]. Human T-lymphotropic virus (LTLV) has affected about 2010 million people in the world [12, 13, 14]. This deadly virus is considered a health problem in endemic regions such as Central Africa, South America and the Middle East (Japan, Iran, Turkey and Iraq) [15, 16] associated with serious diseases such as Adult T-cell Leukemia / Lymphoma (ATL), (HTLV-1 associated myelopathy / Tropical Spastic Paraparesis) HAM / TSP and HAU (HTLV-1 associated uveitis) [12, 13, 14]. In addition, it increases the risk of autoimmune diseases (such as polymyositis and acute rheumatic arthritis) and infectious diseases (tuberculosis, recurrent strongyloidiasis, Hansen's disease) [4]. Since the prevalence of HCV and HTLV in blood donors in varies in different parts of the country and no study has been conducted so far in Kermanshah [2] and its high prevalence in neighboring country of Iraq affects its prevalence in Kermanshah [3, 10, 16], conducting a study on the prevalence of HTLV and HCV among blood donors in Kermanshah is an essential to improve blood transfusions safety [2].

Material and Method

Study group

In this study lasted from February to May 2015, 470 first-time blood donors referring Blood Transfusion Organization in Kermanshah were selected randomly and after obtaining informed consent, demographic data such as age, gender, education , occupation, marital status, blood type, and results of clinical examinations were recorded in file of each person.

Sample collection:

In this study, 5 ml of venous blood were collected from each person through vacuum blood collection tubes containing citrate anticoagulant and then they were centrifuged at around 4500 rpm for 6 minutes, and the separated plasma was stored at -20 ° C.

ELISA and Western Blot Test for HTLV:

The ELISA screening test was conducted firstly with the help of INS HTLV Ab ULTRA Kit. Positive cases were duplicated by ELISA method and in the case of positive result; Western blot confirmatory test was conducted with the help of INNO-LIA HTLV I / II Score Kit to confirm positive cases of HTLV.

ELISA and RIBA Test for HCV:

The ELISA screening test was conducted firstly with the help of Enzygnost Anti-HCV 4.0 Kit. Positive cases were duplicated by ELISA method and in the case of positive result; RIBA confirmatory test was conducted with the help of INNO-LIA HCV Score Kit to confirm positive cases of HCV.

Statistical analysis:

The results were analyzed using SPSS version 16 software and the relationship between the two parameters was considered statistically significant, if sig <0.03.

Results

Demographic information (age, gender, marital status and level of education) of 470 blood donors is shown in Table 1. In the study group, 90 percent were male and 10 percent were female, and most of them (42.1 percent) were in the age group of 20-29 years. Nonparametric test showed significant difference among male and female donors in terms of education level, at the confidence level of 95% (sig = 0.026). Blood type and weight information of all 470 blood donors is shown in Table 2. Using independent T test, it was found that there is significant differences among male and female donors in terms of weight at the confidence level of 99% (sig = 0.000).

In this study, among 470 blood donors, only one person (0.2%) showed positive test in HTLV ELISA Ab screening test for in duplicate form, while it was negative in confirmatory test of Western Blot HTLV, so frequency of HTLV was zero among the study group. On addition, only one person (0.2 percent) in HCV ELISA Ab screening test in duplicate form was positive, which it was conformed in the RIBA test, so HCV frequency in the study group was 0.2% (1 person).

Discussion

According to various studies, due to lack of hemoglobin in women in Iran, 92 percent of blood donors are male. In the present study, 90% of blood donors were male [17, 18]. In this study, one of the of blood donors (0.2%) was reported positive in terms of HTLV using ELISA test, while the result was report-

Table 1.

Parameter		Frequency	Percent (%)	Total
Gender	Male	423	90	470 (100%)
	Female	47	10	
Age(year)	10-19	10	2.1	470 (100%)
	20-29	198	42.1	
	30-39	145	30.9	
	40-49	82	17.45	
	50-59	35	7.45	
Marital status	Single	156	33.2	470 (100%)
	Married	314	66.8	
Education level	Illiterate	12	2.6	470 (100%)
	Under high school	156	33.16	
	High school	157	33.4	
	Academic education	145	30.84	

Table 2.

Parameter		Frequency	Percent (%)	Total
Blood group (ABO)	A	150	31.91	470 (100%)
	B	116	24.68	
	AB	42	8.94	
	O	162	34.47	
Blood group Rh	Positive	417	88.72	470 (100%)
	Negative	53	11.28	
Weight (Kgr)	50-59	9	2	470 (100%)
	60-69	47	10	
	70-79	142	30.2	
	80-89	162	34.4	
	90-99	77	16.4	
	>100	33	7	

ed negative using Western blot test. In Nigeria, 6.5% of blood donors were reported negative in terms of HTLV using ELISA test, while they were reported negative by using Western blot test [4]. ELISA screening test might show false positive result for some acute bacterial infections, autoimmune diseases and multiple pregnancies, due to high sensitivity, low specificity, and antibody nonspecific reactions with virus antigens as result of flu vaccine, severe acute and chronic respiratory syndromes. Therefore, positives results of ELISA test should be confirmed by confirmatory test such as Western blot test, and only those cases should be reported positive that react by both ELISA and Western Blot tests [4, 3, 19]. As type 1 and type 2 antigens of virus HTLV have high similarity and cross reaction, antibodies against type 1 and type 2 of the virus are simultaneously diagnosed in ELISA and Western blot tests. Therefore, information obtained in the study indicates the prevalence of type 1 and type 2 of HTLV virus in blood donors in Kermanshah [19]. In this study, the prevalence of HTLV among 470 blood donor was zero percent, but it was reported 0.21% in Ilam in neighborhood of Kermanshah. The prevalence of HTLV in different cities of Iran is as follows: 0.31% in Western Azerbaijan, 0.01% in Bushehr, 0.11% in Alborz, 0.18% in Hormozgan, 0.04/% in South Khorasan, and 0.38% in Khorasan Razavi [17]. Northeast areas of Iran (Mashhad, Nishapur, Sabzevar) are considered endemic in terms of HTLV [20], which due to routine screening of blood donors, the prevalence of HTLV in these areas is decreasing [17]. The prevalence of this virus among blood donors in America was reported 0.004%, 0.004% in France, and 0.042% in Brazil [19]. Significant difference in the prevalence of this virus in different areas is due to the environmental, social, cultural, and behavior conditions, and the size of the study group. In addition, the prevalence of this virus depends on its prevalence in neighboring countries such as Kuwait, Iraq and Turkmenistan [21]. We believe that blood donors are healthy people in the community [16]. Thus, given the zero prevalence of HTLV in blood donors in this study, it seems that to prevent transmission of this virus and to prevent the spread of diseases associated with it, screening blood donors with high-risk behaviors (having tattoo, having multiple sexual partners, intravenous administration of drugs, surgery, needle stick, and living in prison) is necessary in Kermanshah [19].

In our study, the prevalence of HCV was 0.2%. Its prevalence was 0.037% among blood donors in Ilam [22], 0.18% in Rasht, 0.32% in Gilan, 0.12% in Golestan, 0.09% in Tehran, 0.17% in Qazvin, 0.2% in Arak, 0.2% in Shahrekord, 0.27% in Isfahan, 0.2% in Bushehr , 0.21% in Shiraz, 0.3% in Jahrom, and 0.03% in South Khorasan [23]. The prevalence of this virus among blood donors in the world varies from 0.004% to 1.96% [2], which these differences in various regions are due to the population studied, the size of the study group, study courses, geographical location, and risk factors (having Tattoo, unprotected sex, surgery, and injection of substances), methods, and test kits [23]. The rate of HCV in Iran due to routine screening of blood donors and technical progress of domestic erythropoietin that reduces the need for blood transfusions in patients decreases [24]. However, the transmission of this virus through blood transfusion is a major concern of public health [23], since control and prevention of HCV infection and determining its risk factors are very complex and due to lack of vaccines and appropriate treatment, the best way to cope with HCV is preventing its transmission. For this purpose, routine screening should be conducted in terms of HCV for all blood donors in Kermanshah [10].

Conclusion

Due to the prevalence of HTLV and HCV in blood donors in Kermanshah, HTLV screening test is recommended for blood donors with high-risk behavior and HCV screening test is recommended routinely for all blood donors. HTLV positive cases with ELISA test should be confirmed by Western blot method and to diagnose HCV, it is better that after ELISA and RIBA, RT-PCR test to be performed, because there is the possibility of false positive result in ELISA and RIBA tests. It is recommended that a study with larger to be conducted in this regard in Kermanshah.

Acknowledgement

Hereby, we appreciate all employees of Blood Transfusion Organization and Research Committee of Kermanshah University of Medical Sciences, who helped us in conducting this study.

Competing interests

The authors declare that they have no competing interests.

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How to cite this article:
Zalei B, Pourmand D, Rahmani Y, Bilvaye S. Investigating the prevalence of HTLV and HCV infection in blood donors (for the first time) in blood transfusion organization of Kermanshah, Iran.J Clin Anal Med 2017;8(suppl 5): 509-12.