

Evaluation of antibody frequency against HBV, HCV and HTLV-1

Seyed Mohammad Ebrahim Tahaei, Seyed Reza Mohebbi, Seyed Reza Fatemi, Pedram Azimzadeh, Dariush Mirsattari, Azar Sanati, Afsaneh Sharifian

Gastroenterology and Liver Diseases Research center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

ABSTRACT

Aim: This study was designed to evaluate the frequency of antibody against these viruses in individuals attending the endoscopy ward of Taleghani hospital Tehran, Iran.

Background: Blood-borne viruses such as hepatitis B and hepatitis C virus and HTLV-1 virus are among the world's public health problems. Hepatitis viruses cause liver problems and HTLV-1 infection can lead to adult T-Cell lymphoma (ATL).

Patients and methods: Blood samples of 219 individuals attending the endoscopy ward of Taleghani hospital between years 2009-2011 were collected. A questionnaire containing demographic data was completed for each subject. Blood samples were tested for antibody against HTLV-1, HCV and HBc by ELISA (Dia.pro Italy). In case of positive results for anti-HBc, samples were also tested for HBs Ag antigen.

Results: Ninety two subjects were male and 127 were female. Mean age of the population was 39.87 ± 16.47 . None of the subjects had anti-HCV antibody, while 4 of them had anti-HTLV-1 antibody and 26 anti-HBc antibody; which only two of these individuals had HBs Antibody.

Conclusion: The results of this study show that frequency of anti-HCV and anti-HTLV-1 antibodies are very low, while the frequency of anti-HBc was higher in the population. Since HTLV-1 is the causative agent of a type of blood cancer, it seems that screening of donated bloods in this region should be considered.

Keywords: Hepatitis B virus, Hepatitis C virus, HTLV-1, Frequency.

(Please cite as: Tahaei SME, Mohebbi SR, Fatemi SR, Azimzadeh P, Mirsattari D, Sharifian A. Evaluation of antibody frequency against HBV, HCV and HTLV-1. *Gastroenterol Hepatol Bed Bench* 2012;5(3):161-165).

Introduction

Almost 170 million people are infected with hepatitis C virus (HCV) globally, which accounts for 2 to 2.2 percent of world population. The virus prevalence is various in different countries and has been reported between 0.1% and 12%. The main routes of this virus transmission are through blood, sexual contacts and sharing syringe practiced in shooting galleries (1). In Iran the drug abusers are the main source of infection (2); they transmit the

infection through practicing unsafe sex, sharing syringes and using shared shaving razors. The second important group in danger of gaining the infection are those who received blood before the start of blood screening program in 1995 (3). These include thalassaemia and hemophiliac patients; the prevalence rate of infection in them is 11.8% and 53.3% respectively (3). HCV prevalence in general population in Iran is estimated to be between 0.12% and 0.89% (4).

Many people around the world are infected by hepatitis B virus (HBV). The World Health Organization (WHO) has estimated that almost two

Received: 8 March 2012 *Accepted:* 6 May 2012

Reprint or Correspondence: Seyed Reza Mohebbi, PhD. Research center for Gastroenterology and Liver Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran
E-mail: srmohebbi@gmail.com

billion people have been infected with this virus globally and almost 350 million chronically infected people live worldwide (5). Prevalence of this virus in Southeast Asia, China and some parts of Africa is high and reaches 8%, while in developed countries this rate is lower than 2% (5, 6). According to the latest reports, the rate of HBV prevalence in Iran has declined to less than two percent (7, 8). HCV and HBV are two major causes of liver cirrhosis and hepatocellular carcinoma (HCC) (1, 6) and the rate of HBV-HCV co-infection is different among HBV chronic patients, ranging from 4.54% to 0.7%, which complicates the process of management and treatment of infected people (9, 10).

Human T-cell lymphotropic virus-1 (HTLV-1) was first discovered by Poiesz in the lymphocytes of a patient with cutaneous T-cell lymphoma. This virus, after a long period of incubation time, causes a particular type of lymphoma called adult T-cell lymphoma (ATL) (11, 12). This virus also causes a neurological disorder called tropical spastic paraparesis (TSP) (12). HTLV-1 is highly prevalent in southwest of Japan, Caribbean basin and some parts of Africa (13). In Iran this virus is prevalent in northeast of Iran (Khorasan Province). In a study, the rate of HTLV prevalence in volunteer blood donors of this province reported 0.77% (14). In another study among Thalassaemia patients and healthy control subjects, the researchers found that the rate of HTLV-1 infection among patients was 1.6% in comparison to 0.5% in healthy control subjects (15).

The aim of this study was to assess the HBV, HCV, HTLV-1 seroprevalence among individuals attending the Endoscopy ward and also evaluating the association between some demographic criteria with the status of antibody against these viruses.

Patients and Methods

This descriptive cross sectional study was performed between 2009 and 2011 on two hundred and nineteen individuals attending the endoscopy

ward of Taleghani hospital, Tehran, Iran. Blood samples of enrolled individuals were taken and a questionnaire containing demographic information was filled for each participant. The study was approved by the Institutional Medical Ethics Committees of Research Center for Gastroenterology and Liver Disease of Shaheed Beheshti University of Medical sciences. All participants signed a written consent and anonymity was warranted.

Sera were separated from blood and were kept in -20 degree Celsius freezer until the serologic tests were undertaken. The Antibodies against HTLV-1 and HCV were assessed through Enzyme Linked Immunosorbent Assay method (Dia.pro Italy). For detection of hepatitis B virus infection status, at first sera were tested for antibody against hepatitis B core antigen (anti-HBc Ab) using ELISA technique (Dia.pro) and if the result were positive, then we would test the sera for hepatitis B surface antigen (HBs Ag) (Dia.pro). All of the stages were performed according to the kits' manual.

Test Results and information gained from questionnaires were entered into SPSS program (SPSS Inc, Chicago, USA) and all of statistical analysis was performed by it. Pearson's chi square was carried out to test the independence of discrete variables. Student's t-test was utilized to compare means of some continuous variable of two independent sample groups. Continuous variables are represented as mean \pm standard deviation and other parameters as frequency and percentage. A p-value of 0.05 or less was considered statistically significant and all reported p- values were two sided.

Results

Two hundred and nineteen individuals were enrolled in this study. 92 of them (42%) were male and 127 (58%) were female. The mean age of the

population was 39.87 ± 16.47 years; their age range was between 13 and 84 years old. The mean age of male participants was 37.51 ± 16.33 and the mean age of female participants was 42.97 ± 16.98 . There was no statistically significant relationship between gender and mean age ($P=0.076$).

None of those participated in this study had antibodies against HCV- positive HCV serology. Four subjects (1.83%) had antibody against HTLV-1. Twenty six subjects (11.87%) had antibody against HBc antigen. Two subjects (0.9%) had HBs antigen, a sign of active infection, while 24 of anti-HBc positive individuals (92.31%) had cleared the infection (table 1).

Table 1. The frequency of antibody against HBV, HCV and HTLV-1 among participants*

	Negative	Positive	Total
HBc Ab	193(88.13) [†]	26(11.87)	219(100)
HBs Ag	217(99.1)	2(0.9)	219(100)
HCV Ab	219(100)	0	219(100)
HTLV-1 Ab	215(98.17)	4(1.83)	219(100)

* HBc Ab: Antibody against hepatitis B core antigen, HBs Ag: Hepatitis B surface antigen, HCV Ab: Antibody against hepatitis C virus, HTLV-1 Ab: Antibody against human T-Cell Lymphotropic Virus-1

[†] Frequency (percent)

Mean age of those subjects who had antibodies against HBc Antigen was 48.88 ± 17.46 , whereas the mean age of those negative for antibody was 38.71 ± 16.02 ; the difference in these two groups was statistically significant ($P=0.003$). Fourteen individuals from 26 people with anti-HBc Antibody were female and twelve were male. There was no significant relationship between gender and anti-HBc antibody status ($P= 0.65$). The two subjects who had HBs Ag were a male 51 years old and a female 61 years old.

Because of the low frequency of positive subjects for HTLV-1 antibody and lack of positive individuals for HCV antibody, we were not able to perform any statistical analysis for these patients. However, the mean age of positive subjects for

HTLV-1 was 61.50 ± 15.18 years and the negative individuals were 39.48 ± 16.26 years.

DISCUSSION

Viral hepatitis is one of major concerns of public health in countries like Iran (16). HTLV-1 infection plays an important role in etiology of many cancers including ATL and gastric cancer (13, 17). In our study we did not find any individual with anti-HCV Antibody which was similar to the results achieved by Moradi and colleagues (18). Mohebbi and colleagues in another study found out that the rate of HCV infection was only 0.2% among pregnant women in western Iran (10). It is an indicator that the rate of HCV infection in our country is low. Apparently our findings is in contradiction with the results of Sarkari and colleagues (19), but in that study studied subjects were from a high risk population.

Results of this study showed that a considerable number of participants have had exposure to HBV infection (11.87%), but have cleared the infection. There was a significant relationship between mean age of participants and anti-HBc Ab status, an indicator of a high prevalence of HBV infection in the past. Farzadegan and colleagues reported the rate of Hepatitis B antigen among Iranians between 2.5 and 7.2 percent (20). According to different reports three percent of Iranians were infected in 1980s (21). Additionally we have to keep in mind that with increasing the age of a subject, one's chance of contracting the virus rises accordingly. In Alavian and colleagues review article, gender was mentioned as a risk factor for acquiring HBV infection (8). However, we did not find any association between gender and anti-HBc seropositivity.

Only 0.9% of our studied population had HBs Antigen (an indicator of active infection). This low rate can be an indicator of declining trend of

HBV infection in Iranian general population. This observation can be accounted for by mass mandatory vaccination in children and voluntary vaccination in adults and the improved condition of sanitation in Iran and increase of public knowledge about routes of HBV transmission in recent years. However in high risk individuals the rate of HBV infection in these people is still high (22, 23)

Current study shows that HTLV-1 prevalence rate is 1.82%. Abbaszadegan and colleagues reported the HTLV-1 seroprevalence rate in 2003 in Khorasan province 0.77% (14). Tarhini and colleagues reported that in the years 2004, 2005 and 2006 the rate of HTLV-1 prevalence has declined to 0.5%, 0.44% and 0.42%, respectively (24). Our study shows that the rate of infection in our studied population is higher in comparison to the previous studies. However our study is in accordance with the results of study performed by Arjmand and colleagues on Iranian organ donors that reported the rate of HTLV-1 prevalence 1.87% (25).

Results of this study are in accordance with the results achieved by Heidari and colleague in which they studied the prevalence of blood-borne infections in cardiology ward of a hospital in Mashahd; the rate of HCV, HBV and HTLV-1 infections were 0.3, 2.37 and 2.59 percent, respectively (26). In a study in West Africa the researchers found out that the rate of anti-HBc Ab, HBs antigen, HCV and HTLV-1 in two separate regions were 69.6/76.4, 14.3/17.3, 2.2/1.5 and 1.4/0.5 percent respectively (27). In another study among immigrants to Spain, the researchers found out that the rate of HBV, HCV and HTLV-1 prevalence was 4.1, 2.9 and 0.8 percent respectively (28).

The relatively high HTLV-1 seroprevalence in compared to previous studies is alarming. In the light of achieved results we suggest that in addition to northeastern section of the country, the

screening for HTLV-1 become mandatory for other parts of Iran. In addition, infected women should avoid breast-feeding their children. This practice is being implemented in Japan, a country with a high rate of HTLV-1 seropositivity (29).

References

1. Shepard CW, Finelli L, Alter MJ. Global epidemiology of hepatitis C virus infection. *Lancet Infect Dis* 2005;5:558-67.
2. Alavian SM. Hepatitis C virus infection: Epidemiology, risk factors and prevention strategies in public health in IR IRAN. *Gastroenterol Hepatol bed bench* 2010;3: 5-14.
3. Samimi-Rad K, Hosseini M, Mobeini G, Asgari F, Alavian S, Tahaei M, et al. Hepatitis C virus infection among multi-transfused patients and personnel in haemodialysis units in central Islamic Republic of Iran. *EMHJ* 2012;18:227-35.
4. Alavian SM, Gholami B, Masarrat S. Hepatitis C risk factors in Iranian volunteer blood donors: A case-control study. *J Gastrol Hepatol* 2002;17:1092-97.
5. Marcellin P. Hepatitis B and hepatitis C in 2009. *Liver Int* 2009;29:1-8.
6. Perumalswami PV, Bini EJ. Epidemiology, natural history, and treatment of hepatitis B virus and hepatitis C virus coinfection. *Minerva Gastroenterol Dietol.* 2006; 52:145-55.
7. Ghavanini A, Sabri M. Hepatitis B surface antigen and anti-hepatitis C antibodies among blood donors in the Islamic Republic of Iran. *East Mediterr Health J* 2000; 6:1114-16.
8. Alavian SM, Fallahian F, Lankarani KB. The changing epidemiology of viral hepatitis B in Iran. *J Gastrointestin Liver Dis* 2007;16:403-406.
9. Tahaei SME, Mohebbi SR, Azimzadeh P, Vahedi M, Almasi S, Romani S, et al. Frequency of HIV and HCV Co-Infections in Chronic HBV Patients Referred to Taleghani Hospital, Tehran, Iran from 2006 to 2010. *Hepat Mon* 2011;11: 993-96.
10. Mohebbi SR, Sanati A, Cheraghipour K, Rostami Nejad M, Mohaghegh Shalmani H, Zali MR. Hepatitis C and Hepatitis B Virus Infection: Epidemiology and Risk Factors in a Large Cohort of Pregnant Women in Lorestan, West of Iran. *Hepat Mon* 2011;11:736-39.
11. Poiesz BJ, Ruscetti FW, Gazdar AF, Bunn PA, Minna JD, Gallo RC. Detection and isolation of type C retrovirus

particles from fresh and cultured lymphocytes of a patient with cutaneous T-cell lymphoma. *Proc Natl Acad Sci U S A* 1980;77:7415-19.

12. Yoshida M, Miyoshi I, Hinuma Y. Isolation and characterization of retrovirus from cell lines of human adult T-cell leukemia and its implication in the disease. *Proc Natl Acad Sci U S A* 1982;79:2031-35.

13. Proietti FA, Carneiro-Proietti ABF, Catalan-Soares BC, Murphy EL. Global epidemiology of HTLV-1 infection and associated diseases. *Oncogene* 2005;24:6058-68.

14. Abbaszadegan MR, Gholamin M, Tabatabaee A, Farid R, Houshmand M, Abbaszadegan M. Prevalence of human T-lymphotropic virus type 1 among blood donors from Mashhad, Iran. *J Clin Microbiol* 2003;41:2593-95.

15. Moradi A. Seroepidemiology of HTLV-1 in thalassemia patients from both Zahedan and Zabol in 1380. *The Scient J Zanjan Uni Med Sci* 2004;43:43-47.

16. Mohebbi S, Amini Babil Olyae S, Zali N, Noorinayer B, Derakhshan F, Chiani M, et al. Molecular epidemiology of hepatitis B virus in Iran. *Clinical Microbiology and Infection* 2008;14:858-66.

17. Tahaei SM, Mohebbi SR, Fatemi SR, Mohammadi P, Malek FN, Azimzadeh P, et al. Low frequency of human T-cell lymphotropic virus 1 antibodies in Iranian gastric cancer patients in comparison to controls. *Asian Pac J Cancer Prev* 2011;12:2447-50.

18. Moradi S, Najmaddin A, Hosseinzadeh B, Safari M. Study of the prevalence of hepatitis C in type II diabetic patients. *J Army Univ Med Sci* 2009;7:34-35.

19. Sarkari B, Eilami O, Khosravani A, Sharifi A, Tabatabaee M, Fararouei M. High Prevalence of Hepatitis C Infection among High Risk Groups in Kohgiluyeh and Boyerahmad Province, Southwest Iran. *Arch Iran Med* 2012;15:271-4.

20. Farzadegan H, Harbour C, Ala F. The prevalence of hepatitis B surface antigen and its antibody in blood donors and high risk groups in Iran. *Vox Sang* 1979;37:182-86.

21. Merat S, Malekzadeh R, Rezvan H, Khatibian M. Hepatitis B in Iran. *Arch Iranian Med* 2000;3:192-201.

22. Saleh M, Kazemifar AM, Saleh AE, Hoseinpournobari AA. The prevalence of Hepatitis B, Hepatitis C and HIV among dead drug abusers in Hamedan. *Iranian Journal of Forensic Medicine* 2012;16:253-58.

23. Amin-Esmaeili M, Rahimi-Movaghar A, Razaghi EM, Baghestani AR, Jafari S. Factors Correlated With Hepatitis C and B Virus Infections Among Injecting Drug Users in Tehran, IR Iran. *Hepat Mon* 2012;12:23-31.

24. Tarhini M, Kchour G, Zanjani DS, Rafatpanah H, Otrouk ZK, Bazarbachi A, et al. Declining tendency of human T-cell leukaemia virus type I carrier rates among blood donors in Mashhad, Iran. *Pathology* 2009;41:498-99.

25. Arjmand B, Aghayan SH, Goodarzi P, Farzanehkhah M, Mortazavi SM, Niknam MH, et al. Seroprevalence of human T lymphotropic virus (HTLV) among tissue donors in Iranian tissue bank. *Cell Tissue Bank* 2009;10:247-52.

26. Heydari AA, Ebrahimi M. Screening of blood-borne infections in heart catheterized patients. *Med J Mashhad Univ Med Sci* 2008;51:19-24.

27. Collenberg E, Ouedraogo T, Ganame J, Fickenscher H, Kynast-Wolf G, Becher H, et al. Seroprevalence of six different viruses among pregnant women and blood donors in rural and urban Burkina Faso: A comparative analysis. *J Med Virol* 2006;78:683-92.

28. Toro C, Jimenez V, Rodriguez C, Del Romero J, Rodes B, Holguin A, et al. Molecular and epidemiological characteristics of blood-borne virus infections among recent immigrants in Spain. *J Med Virol* 2006;78:1599-608.

29. Hino S. Establishment of the milk-borne transmission as a key factor for the peculiar endemicity of human T-lymphotropic virus type 1 (HTLV-1): the ATL Prevention Program Nagasaki. *Proc Jpn Acad Ser B Phys Biol Sci* 2011;87:152-66.