Turk J Hematol 2007; 24:4-7

RESEARCH ARTICLE

Seropositivity rates of HBsAg, anti-HCV, anti-HIV and VDRL in blood donors in Eastern Turkey

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Received: *Oct 10, 2006* • ***Accepted:*** *Jun 23, 2007*

ABSTRACT

Infections caused by hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency viruses (HIV) remain the leading most important health problems worldwide. Screening tests such as HBsAg, anti-HCV, anti-HIV and VDRL are mandatory tests to look at before transfusion of blood or blood components. In this study, donors who applied to our Blood Center in a nine-year period were retrospectively evaluated with respect to HBsAg, anti-HCV, anti-HIV and syphilis seroprevalence. HBsAg, anti-HCV and anti-HIV were examined by microparticle ELISA system, and syphilis antibodies were screened by a syphilis test device. Of the total 39,002 individuals, 16,601 (42%) were females and 22,401 (58%) were males. HBsAg positivity was found in 2.55%, anti-HCV in 0.17%, anti-HIV in 0.036%, and VDRL in 0.057% of overall donors. As a result, HBsAg, anti-HCV, anti-HIV and VDRL seropositivity rates in donors living in our region were found lower than those in many regions of Turkey. Nevertheless, because there is no screening method to reduce the risk resulting from transfusion to zero, it appears that it is essential to adopt strict criteria in the selection of donors and to avoid unnecessary transfusion.

Key Words: Blood donors, HBsAg, Anti-HCV, Anti-HIV, VDRL seroprevalence

ÖZET

Türkiye'nin doğu bölgesindeki kan donörlerinde HBsAg, anti-HCV, anti-HIV ve VDRL seropozitivite oranları

İnsan bağışıkyetmezlik virusu (HIV), Hepatit B ve Hepatit C virüslerinin neden oduğu infeksiyonlar halen önde gelen en önemli sağlık problemi olmaya devam etmektedir. HBsAg, anti-HCV, anti-HIV ve VDRL gibi tarama testleri kan ürünleri veya kan transfüzyonlarından önce bakılması zorunlu testlerdir. Bu çalışmada, kan merkezimize 9 yıl içinde başvuran dönorler HBsAg, anti-HCV, anti-HIV ve sifiliz seroprevalansı açısından retrospektif olarak değerlendirildi. HBsAg, anti-HCV, anti-HIV ELİSA mikropartikül sistemi ile incelenirken sifiliz antikorları ise sifiliz test cihazı ile tarandı. Toplam 39.002 kişiden 16.602 (%42)'si kadın ve 22.401 (%58)'i de erkekti. HBsAg, tüm donörlerin %2.55'inde pozitif olarak bulunurken, anti-HCV, anti-HIV ve VDRL pozitifliği sıra ile tüm dönorlerin %0.17, %0.036, %0.057'sinde pozitifti. Sonuç olarak bölgemizde yaşayan donörlerdeki HBsAg, anti-HCV, anti-HIV ve VDRL seropozitifliği Türkiye'de bulunan çoğu bölgelerdekinden daha düşük bulundu. Yine de transfüzyondan kaynaklanan riskleri azaltıp sıfıra indirecek her hangi bir tarama metodu bulunmaması nedeni ile, gereksiz transfüzyonlardan kaçınılmasına ve donör seçiminde daha dikkatli davranılmasına ihtiyaç vardır.

Anahtar Sözcükler: Kan donörleri, HBsAg, anti-HCV, anti-HIV, VDRL seroprevalansı

INTRODUCTION

The risk for infection with transfusion-transmitted viruses has been significantly reduced by the use of highly sensitive tests for blood-borne pathogens and the adoption of strict criteria in the selection of donors [1,2]. However, despite these improvements, a zero risk blood supply remains a popular goal [3-7]. Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency viruses (HIV) type 1 and type 2 are among the viruses causing a major problem in transmission by transfusion. Several screening tests for these infectious agents such as HBV surface antigen (HBsAg), anti-HCV, anti-HIV and syphilis antibody tests are routinely done throughout the world as well as in our country before transfusion in order to achieve safe blood transfusion and to minimize post-transfusion infections.

Studies performed in different regions of our country have revealed that HBsAg positivity is between 2.3% and 8.7%, anti-HCV positivity between 0.12% and 4.7%, anti-HIV positivity between 0% and 0.66% and Venereal Disease Research Laboratory (test) (VDRL) positivity between 0.002% and 0.6% in donors. In this study, HBsAg, anti-HCV, anti-HIV and syphilis reagin antibody (VDRL) tests results have been retrospectively evaluated in blood donors donating to our Blood Center.

MATERIALS and METHODS

The study was performed between 1995 and 2003 at the Blood Center of the Medical Faculty Hospital of Yüzüncü Yıl University, Van. The major end points were to determine the prevalence of HBsAg, anti-HCV and anti-HIV in addition to syphilis antibody among a healthy blood donor population in this area of Turkey. The calculation of the prevalence of HBsAg, anti-HCV, anti-HIV and syphilis antibody was retrospectively done by investigating the records of healthy donors within this period. Of the total 39,002 individuals who were enrolled in the study, 16,601 (42%) were females and 22,401 (58%) were males, with an average age of 34 (age range 20-60) years. Testing for HBsAg, anti-HCV and anti-HIV was done by using commercially available microparticle ELISA system (Axsym, Abbott, USA). The same generation micro ELISA test kits were used during a nine-year period. The presence of antibodies for syphilis was tested using a rapid plasma reagin (RPR) test (ultra syphilis tests device, Acon, USA).

Table 1. Seropositivity rates of HBsAg, anti-HCV, anti-HIV and VDRL according to years.

Year	*HBsAg*	*anti-HCV*	*anti-HIV*	*VDRL*
1995	2.32%	0%	0%	0%
1996	1.75%	0.06%	0%	0%
1997	1.42%	0.11%	0%	0.02%
1998	2.44%	0.11%	0%	0%
1999	2.21%	0.15%	0%	0%
2000	3.67%	0.24%	0.05%	0.02%
2001	2.57%	0.13%	0.05%	0.05%
2002	1.3%	0%	0%	0%
2003	2.1%	0.18%	0.08%	0.08%

RESULTS

HBsAg seropositivity in overall donors was 2.55%, and anti-HCV was positive in 0.17%, anti-HIV in 0.036%, and VDRL in 0.057%. Seropositivity rates of HBsAg, anti-HCV, anti-HIV and VDRL according to year are shown in Table 1. As seen in the Table, some differences in seropositivity rates have occurred over the years. No anti-HIV positivity was even recorded until the year 2000, after which it was shown to decrease again. VDRL seropositivity rates are quite low and show no apparent differences according to years. HBsAg and anti-HCV seropositivity rates vary over the years (Table 1). While anti–HCV positivity rate was 0% in 1995 and 2002, it was found between 0.06% and 0.24% in other years. HBsAg positivity rate was found as 1.42%, 3.67% and 1.3% in 1997, 2000 and 2002, respectively. As seen in the Table, there is no regular increase or decrease in the rates of HBsAg and anti-HCV according to years.

DISCUSSION

Transfusion of blood and blood components is the main transmission route of infectious agents such as HBV, HCV and HIV. Frequency of HBV infection is quite prevalent, and it is known that some regional differences exist in the frequency of HBV and HCV infection. Our study has revealed that HBsAg was positive in 2.55%, anti-HCV in 0.17%, anti-HIV in 0.036% and VDRL in 0.057% of overall donors in our region.

It is estimated that there is an average of 450 million HBV carriers worldwide and approximately 3 million carriers in our country. In spite of HBsAg screening in blood donors, HBV infection can develop due to transfusion.

Tablo 2. Seropositivity rates of HBsAg, anti-HCV, anti-HIV and VDRL in some centers in Turkey

Center	*HBsAg*	*anti-HCV*	*anti-HIV*	*VDRL*
Van (this study)	2.55%	0.17%	0.03%	0.057%
Ankara	2.3%	1.2%	0.5%	0.06%
Adana	4.52%	-	-	-
Konya	4.7%	0.25%	-	-
Diyarbakır	8.7%	0.7%	0.03%	0.6%
Afyon	4.3%	4.7%	-	-
Erzurum	4.5%	0.5%	-	-
İstanbul	3.13%	0.46%	0.66%	0.14%
Bursa	3.6%	0.07%	0%	0.002%
Trabzon	3.97%	0.82%	0%	0.48%
Çorum	3.82%	-	-	-
Malatya	5.16%	-	0%	-
Isparta	2.72%	1.31%	0.0022%	0.23%

HBsAg positivity rates in donor populations in different regions of our country vary between 2.3% and 8.7% (Table 2). The highest HBsAg positivity rate in our country has been reported from Diyarbakır as 8.7% [8] and the lowest from Ankara as 2.3% [1]. HBsAg positivity rates from other regions of Turkey have been reported as 3.9% in Trabzon [9], 3.4% in İstanbul [10], 3.6% in Bursa [11], 4.5% in Adana [3], 5.16% in Malatya [12], 4.96% in Konya [13] and 2.72% in Isparta [14] (Table 2). HBsAg positivity rate is reported to be 4.5% in Erzurum, which is located in the same geographic region (Eastern Anatolia) as Van [15]. Turkey's average HBsAg positivity rate has been reported as 4.7% [5]. When compared with these results, HBsAg prevalence in donors living in our region appears to be lower than the prevalence in Erzurum and the Turkey average.

We use macro ELISA method in screening tests in our center. Specificity of this method has been reported as 97.8% and its sensitivity as 100% in HBsAg. We believe there may be several explanations for the lower positivity rate of HBsAg in our center. In some centers of Turkey, card tests and lam agglutination methods, etc. are used as screening tests. This may cause higher overall positivity rates in Turkey. Another reason may be that a relatively low population lives in our region and the people are well acquainted. Thus, selection of donors may have been better in our center.

Based on the results of anti-HCV tests, it is estimated that approximately 500 million individuals have been exposed to HCV worldwide. Studies performed in our country show that anti-HCV prevalence in blood donors is between 0.12% and 1.7% (Table 2). In our study, this rate was found as 0.17%, lower than the rate of 0.5%, found in Erzurum, another city of Eastern Anatolia [15]. When we take a look at the other regions of Turkey, the highest anti-HCV positivity rate is reported from Afyon as 1.7% and the lowest from Ankara as 0.12% [13,16]. Anti-HCV positivity rates reported from other regions are 0.25% from Konya, 0.82% from Trabzon, 0.7% from Diyarbakır, 0.5% from İstanbul, and 0.7% from Bursa (Table 2).

HIV is seen in lower rates in our country in comparison with European, North American, Far East Asian and African countries. HIV attracted more attention after 1981 and anti-HIV screening tests have been obligatory since 1985 in our country. According to the results reported from other regions of Turkey, anti-HIV positivity rates range between 0% and 0.66% (Table 2). While it was not encountered in donors living in our region until the year 2000, it is seen currently,

even if only rarely. Anti-HIV positivity rate was determined as 0.036% in our region. Anti-HIV positivity has been reported as 0.01% in Ankara, 0.03% in Diyarbakır and 0.66% in İstanbul [8,10,17]. On the other hand, in some studies from other parts of the country such as Bursa, Malatya and Trabzon, anti-HIV positivity has not been reported in blood donors [9,11,12].

VDRL and RPR are the screening tests used in Blood Banks as syphilis screening tests. False positives are known to be high secondary to some reasons except from syphilis. VDRL positivity rates in blood donors in our country are reported as between 0.002% and 0.6% [8,11]. VDRL positivity rate was determined as 0.057% in our study. VDRL positivity has been reported from other regions as 0.6% in Diyarbakır, 0.002% in Bursa and 0.6% in Ankara [1,8,11].

In conclusion, blood donors in our region show lower seropositivity rates in comparison with some other regions of our country. When we studied our results, different values especially in HBsAg were noted over the years. However, there was no regular increase or decrease in the rates of positivity (Table 1). In general, the problem of achieving safe blood has become a current issue worldwide and there is no available method to reduce the risk caused by transfusion to zero. Thus, it appears to be essential to select appropriate donors and to avoid unnecessary transfusion.

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