Research Article

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Six-Year Analysis of the Seropositivity of HBV, HCV, HIV, and Syphilis in Volunteer Blood Donors Attending Our Blood Center

Kan Merkezimize Başvuran Gönüllü Kan Bağışçılarında Altı Yıllık HBV, HCV, HIV ve Sifiliz Seropozitifliğinin Değerlendirilmesi

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ABSTRACT

Objective: To compare the seropositivity rates detected by microbiologic screening tests performed in a six-year period in volunteer blood donors in our blood center with the rates in the general population in Turkey.

Materials and Methods: This cross-sectional study included 45.632 volunteer blood donors who attended our blood center between 2007 and 2013. Each sample from volunteer donors was tested for HBsAg, anti-HCV, and anti-HIV 1 and 2 by the chemiluminescent microparticle enzyme immunoassay (CMIA) method. The screening for syphilis was done by a nontreponemal test for the first four years and, then, by CMIA-based treponemal test (Architect Syphilis TP; Abbott) for the last two years.

Results: Out of all donors, 743 (1.62%) was found to be positive for at least one screening test. Seropositivity rates for HBsAg, Anti-HCV, anti-HIV 1, 2, and syphilis were 1.01%, 0.51%, 0.09%, and 0.004%, respectively.

Conclusion: The rate of HbsAg positivity was low compared to that in the general population reported by the National Viral Hepatitis Prevention Association. The anti-HCV, syphilis, and anti-HIV positivity rates found in this study were compatible with the results of the studies performed on the general population.

Key Words: Blood donors, HBsAg, anti-HCV, anti-HIV, RPR

Conflict of interest: The authors reported no conflict of interest related to this article.

ÖZET

Amaç: Altı yıl içinde kan hizmet birimimizde kan bağışı yapan gönüllü bağışçılarda saptanan mikrobiyolojik tarama testlerindeki pozitiflik oranının ülkemiz ortalamaları ile karşılaştırılmasıdır.

Gereç ve Yöntemler: Bu kesitsel çalışmaya 2007-2013 yılları arasında kan merkezimize başvuran 45.632 gönüllü kan donörü alınmıştır. Gönüllü donörlerden alınan her örnekten HBsAg, Anti HCV ve Anti HIV 1-2 testleri kemilüminesan mikropartikül enzim immünoassay (CMIA) yöntemi ile çalışılmıştır. Sifiliz için taramada ilk dört yılda nontreponemal karbon slide testi, son iki yılda ise CMIA temeline dayalı bir treponemal test (Architect Syphilis TP; Abbott) kullanılmıştır.

Bulgular: Tüm bağışçıların 743'ünde (%1,62) tarama testlerinden biri pozitif bulunmuştur. HBsAg, Anti-HCV, Sifiliz ve Anti-HIV 1, 2 seropozitiflikleri sırasıyla %1,01, %0,51, %0,09, %0,004 olarak saptanmıştır.

Sonuç: Saptadığımız oranlar ülkemiz genelinde Viral Hepatit Savaşım Derneği'nin çalışmalarına göre bulunan HBsAg seropozitifliğine göre düşük, Anti-HCV seropozifliğine göre ise benzer bulunurken, sifiliz ve anti-HIV seropozitiflik oranları ülkemizde yapılan değişik çalışmalarla uyumlu olarak bulunmuştur.

Anahtar Kelimeler: Kan bağışçıları, HBsAg, anti-HCV, anti-HIV, RPR

Çıkar çatışması: Yazarlar bu makale ile ilgili olarak herhangi bir çıkar çatışması bildirmemişlerdir.

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Introduction

The most important concern in modern transfusion medicine is to prevent the transmissions of infectious agents from donor to recipient. Although all kinds of infectious agents can be transmissible through blood products, viral infections are the most important transfusion-transmissible infections. Sepsis, encountered after transfusion of bacterial-contaminated blood and components, is a rare and frightening complication with a high mortality. Viral infections that escape serological identification in the window period are troublesome. Currently, it has been reported that approximately 500 million people are infected by HBV, whereas 100 million people have HCV (1,2). Therefore, donor questionings and screenings should be tightly done and those with suspicious behaviour regarding sexually transmitted diseases be prevented from donation.

The choice of screening tests varies according to national epidemiological data, policy against blood donation, and issues regarding cost-effectiveness. In our country, the screening tests carried out on all blood donors include HBsAg, anti-HCV, anti-HIV 1 and 2 antibodies, and antibody against Treponema pallidum.

Serological screenings almost reflect prevalence rates of infections of interest in that region. In this study, we retrospectively investigated the results of screening assays in blood donors attended our blood center between 2007 and 2013, and aimed to determine the seropositivity rates for HBV, HCV, HIV and syphilis in the region.

Materials and Methods

At our central blood center, each sample from volunteer donors were tested for HBsAg, anti-HCV, and anti-HIV 1 and 2 by the chemiluminescent microparticle enzyme immunoassay (CMIA) method. The screening for syphilis was done by nontreponemal test for the first four years, and then by CMIA-based treponemal test (Architect Syphilis TP; Abbott) for the last two years. Positive samples underwent two rounds of tests. Repetitive positivity in at least once in the same sample was accepted as reactive, and that blood component was sacrificed. Reactivity detected in anti-HIV 1 and 2 mandated confirmation by Western blot analysis. All other reactivities were further evaluated by infectious diseases consultant. Comparisons of the seropositivity rates between the years 2007 and 2013 were statistically determined by multiple tabs chi-square (x2) test. Statistical significance was designated by $p<0.05$.

Results

Over the period of six years, 45.632 volunteer donated blood in our center. Totally, 743 samples (1.62%) were found to be positive for at least one screening test. Donation numbers increased in each consecutive year. The seropositivity rates were similar between years 2007 and 2011, whereas it declined throughout last two years.

The rates of seropositivity for HBsAg, anti-HCV, anti-HIV 1 and 2, and syphilis were 1.01%, 0.51%, 0.09%, 0.004%, respectively.

The distribution of positive samples according to years is shown in Table 1, and seropositivity rates for each screening test carried out are shown in Table 2.

Seropositivity rate for HCV showed statistically significant decrease between the first and last years of the study, whereas it was found to be increased for syphilis for the same period ($p<0.05$).

Discussion

The most important issue in transfusion medicine is blood safety. The World Health Organization describes "safe blood" as the one that does not contain any infectious and noxious particles in and not cause any disease to the recipient (3). Despite appropriate screening tests, there have been still unsafe blood transfusions due to so called "window period" for the infection, atypical seroconversions, emergence of variant viruses, and the limitations of virus detection techniques. Epidemiological studies on hepatitis B and C infections are generally based on screenings of blood donors. The limitation of these studies are underestimation of seroprevalence rates compared to general population because donors with history of hepatitis or risky sexual behaviour are eliminated at hand before donation (4,5). Actually the prevalence rates of HBsAg and anti-HCV reported from regional studies by The National Viral Hepatitis Prevention Association are 2.7%, and 0.7%, respectively (6,7). In our study the prevalence rates were1.01% and 0.51%, respectively.

Transfusion related hepatitis B infection rates vary in different countries around the world, even in geographical regions in the country. Turkey is located in mid-endemic area. The rate of HBsAg in donor population has gradually decreased owing to policies for implementation of preventive health care measures. A previous sixteen-year survey showed significant decrease in the rate from 5.23% in 1991 to 2.1% in 2004 (8). In our study, the rate declined from 1.2% in 2008 to 0.6% in 2013. In recent studies, the rate of HBsAg seroprevalence reported from blood centers in Turkey ranged between 0.9% and 1.9% (6). The incorporation of hepatitis B vaccine to national vaccination programme in our country in 1998 and catch-up vaccination of all nationwide primary school students in 2007 have suggested gradual decrease in rates in coming years.

Recent studies conducted in blood centers have reported anti-HCV positivity of 0.2-0.5% (7). 61.409 blood donors surveyed in our center between 2002 and 2006 revealed anti-HCV seropositivity rate of 0.54% (9). In our study, the prevalence rate of anti-HCV surveyed among 45.632 volunteer donors was 0.51%. The decline in the rate is attributed to the improvement in awareness of the population against sexually-and/or transfusion-transmitted

Table 1. The year-distribution of positivity in donors

	Donation number	Seropositivity number	Percent of seropositivity (%)
2007 (last 6 months)	3735	65	1.74
2008	7731	144	1.86
2009	5453	92	1.68
2010	7543	141	1.86
2011	9593	157	1.63
2012	9432	119	1.26
2013 (first 8 months)	2145	25	1.16
Total	45632	743	1.62

Table 2. The distribution of seropositivity rates for agents

	Donation number (n)	HBsAg (+)		Anti HCV (+)		Syphilis (+)		Anti HIV 1, 2 (+)	
		n	%	n	%	n	%	n	%
2007 (last 6 months)	3735	42	1.12	22	0.58	1	0.02	0	0
2008	7731	94	1.21	45	0.58	4	0.05	1*	0.01
2009	5453	66	1.21	24	0.44	2	0.03	0	0
2010	7543	91	1.20	48	0.63	2	0.02	0	0
2011	9593	97	1.01	54	0.56	5	0.05	1*	0.01
2012	9432	59	0.62	36	0.38	24	0.25	0	0
2013 (first 8 months)	2145	13	0.60	5	0.23**	7	0.32**	0	0
TOTAL	45632	462	1.01	234	0.51	45	0.09	2	0.004

*Repeated reactivity: Western blot is negative in one, no information for second one, **p<0.05

infections, and also to the use of new generation assays in screening tests.

The number of HIV-positive and AIDS cases obtained from the last reports from The Turkish Ministry of Health were 5935 and 1115, respectively (10). We detected anti-HIV reactivity in two donors in our study. Western blot assay was negative in one of them. The rate of reactivity was 0.004%. The rate in various studies in our country was between 0.0013 and 0.1% (11,12,13,14). Deveci et al. did not detect seropositivity among 784 volunteer blood donors in their study (3).

Syphilis screening is also mandatory in all blood donors in our country. Syphilis is the first disease known to be transmitted by transfusion. The infectivity of blood contaminated by T. pallidum disappears when blood products are kept at 4 ^{0}C for more than three days. Therefore, the screening for stored blood products is not recommended. In the study presented here, the rate of syphilis antibody prevalence by nontreponemal tests ranged between 0.02% and 0.005%, by treponemal tests, on the other hand, the rate was seemed high as 0.2 to 0.3 % due to positive reactions observed from recovered infections. Other studies from our country with high donor numbers revealed 0.08 to 0.3% seropositivity for syphilis (11,12,15,16).

The results of this study indicated that HBsAg seroprevalence in our region is lower than the nationwide seroprevalence rate reported by The National Viral Hepatitis Prevention Association, while seroprevalence rates for anti-HCV, syphilis antibody, and anti-HIV 1, and 2 are similar to the general population.

References

1. Gül M, Çıragil P, Aral M, Doğramacı N. Gönüllü ve gönüllü olmayan kan donörlerinde HBV, HCV, HIV, Sifiliz tarama test sonuçlarının değerlendirilmesi. Turk Mikrobiyol Cem Derg. 2006;36(1):35-39.
2. Şanlı K, Sarı ND, Hatipoğlu N. Kan merkezimize başvuran donörlerin 10 yıllık tarama sonuçlarının değerlendirilmesi. JOPP Derg. 2013;5(3):136-141.
3. Deveci Ö, Tekin A, Günbay SS, Kılıç D, Kaygusuz S, Ağalar C, Özer TT. Kan bağışçılarında HBsAg, anti-HCV, anti-HIV ve VDRL testi sonuçlarının değerlendirilmesi. J Clin Exp Invest 2011;4:416-419.
4. Kaya S. Kan donörlerinde hepatit B virusu, hepatit C virusu ve İnsan immun yetmezlik virusu ve sifiliz sıklığı. Klimik Derg. 2008;2:65-68.
5. Van der Bij AK, Coutinho RA, Van der Poel CL. Surveillance of risk profiles among new and re-peat blood donors with transfusion-transmissible infections from 1995 through 2003 in the Net-herlands Transfusion. 2006:10:1729-1736.
6. Tosun S. Türkiye'de viral hepatit B epidemiyolojisi yayınların metaanalizi.Ed.Tabak F,Tosun S. Viral Hepatit 2013.1.Baskı. İstanbul: Viral Hepatitle Savaşım Derneği. 2013:25-81.
7. Mıstık R. Hepatit C virüs enfeksiyonunun epidemiyolojisi. Ed. Tabak F,Tosun S. Viral Hepatit 2013.1.Baskı.İstanbul: Viral Hepatitle Savaşım Derneği. 2013:81-113.
8. Emekdaş G, Çavuşoğlu S, Artuk C, Aksoy A. Türkiyede 16 yıllık HBV ve 10 yıllık HCV trendi: Kan donör verileri. Klimik Derg. 2005;18:312-313.
9. Ağuş N, Yılmaz N, Cengiz A, Şanal E, Sert H. Kan donörlerinde HBsAg, Anti HCV, Anti-HIV se-roprevelansı. ANKEM Derg 2008;1:7-9.
10. http://thsk.saglik.gov.tr/Dosya/bulasici-hastaliklar-db/Dnya_AIDS_Gn_02122013.pdf
11. Kader Ç, Erbay A, Birengel S, Gürbüz M. Kan donörlerinde hepatit B virüsü, Hepatit C virüsü, İn-san İmmun Yetmezlik virüsü infeksiyonu ve sifilis seroprevelansı. Klimik Derg. 2010;3:95-99.
12. Kaya S, Alanoğlu G, Polat M, Sipahi T. Süleyman Demirel Üniversitesi Tıp Fakültesi kan merke-zinin 2000-2007 yılları tarama test sonuçları. S.D.Ü Tıp Fak Derg. 2009;2:13-15.
13. Uzun C. Kan donörlerinde HBsAg, anti-HCV,anti-HIV ve RPR sonuçlarının değerlendirilmesi. Türk Mikrobiyol Cem Derg. 2008;3-4:143-146.
14. Karagöz G, Kadanalı A, Bektaşoğlu MF, Dede B, Altuğ SB. Kan donörlerinde hepatit B, hepatit C, İnsan İmmun Yetmezlik virusu ve Sifiliz enfeksiyonları seroprevelansı.Viral Hepatit Dergisi. 2012:1:26-28.
15. Eraksoy H. Kan transfüzyonuna bağlı bakteri infeksiyonları ve Sifilis. Klimik Derg. 1990;2:65-69.
16. Ulutürk R. Kan donörlerinde yapılan rutin tarama testlerinin 11 yıllık değerlendirilmesi. Türk Mik-robiyol Cem Derg. 2010;1:41-47.