

Infectious Disease Markers among Directed and Volunteer Blood Donors in Korea[†]

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= Abstract = **Most reports from Western countries are discouraging the establishment of direct donation programs since little evidence exists that this approach improves the safety of blood transfusion. However, the infectious disease marker frequencies vary from one region to another and not much is known about the figures in less individualized, and more culturally uniform societies. The authors compared the frequency of infectious disease markers among 14,253 directed and 1,228,132 volunteer blood donors in Korea. The frequency of hepatitis B surface antigen (HBsAg) was higher in volunteer donors while the frequency of elevated alanine aminotransferase (ALT) and VDRL was higher in directed donors ($p < 0.01$). Our data suggest that even in a less individualized society where people are more open to exchange their medical and personal information, directed donation does not confer significant benefit in the prevention of transfusion-transmitted diseases.**

Key Words: *Infectious disease markers, Directed donation, Korea*

INTRODUCTION

There are increasing numbers of requests for autologous and directed transfusion from patients who are afraid of contracting infectious diseases such as acquired immunodeficiency syndrome (AIDS) and viral hepatitis through blood transfusion. Although autologous blood is the safest blood available for transfusion, autologous donation may not always

be feasible or provide sufficient quantities for surgery. Most reports from Western countries are discouraging the establishment of directed donation programs since little evidence exists that this approach improves the safety of the blood transfusion (Cordell *et al.* 1986; Kruskall and Umlas 1988; Collins and Churchill 1989; Kanter and Hodge 1989; Page 1989; Chambers *et al.* 1990). However, the marker frequencies vary from one region to another and not all the objections raised in Western countries against the desirability of directed donation are of equal validity in less individualized Oriental societies (Grindon 1991; Nurse 1993). The authors compared the frequency of infectious disease markers in directed and volunteer blood donors in Korea.

MATERIALS AND METHODS

From May, 1991 through March, 1993, Seoul

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National University Hospital drew 14,253 directed donors(DDs) and, in 1992, the Korean Red Cross Blood Center drew 1,228,132 voluntary donors(VDs). First degree family members were discouraged as directed donors out of fear of the graft-versus-host disease (GVHD)(McMilin and Johnson 1993). Routinely, donors were required to make two visits. The first visit included having blood drawn to have all routine screening tests performed (ABO/Rh, VDRL, Hepatitis B surface antigen (HBsAg), antibody to hepatitis C virus (anti-HCV), antibody to human immunodeficiency virus (anti-HIV) and alanine aminotransferase(ALT)). A second appointment, to donate the full unit, was tentatively set at this time. If the ABO/Rh was suitable and all tests were negative, the donor was notified and the donation appointment was confirmed. If the donor was not suitable, the donor was notified and the second visit was cancelled.

HBsAg was determined by enzyme-linked immunosorbent assay (ELISA) (Enzygnost HBsAg monoclonal[®], Behring, Germany). Anti-HCV was also determined by ELISA and was switched from the first generation to the second generation assay during the study period (DD: Abbott HCV EIA[®], Abbott, Germany switched to Abbott HCV EIA,2nd generation[®], Abbott Korea, Korea, VD: Ortho HCV[®], Ortho, U.S.A. switched to Lucky HCD[®], Lucky, Korea). Screening for AIDS was done by the Enzygnost anti-HIV micro[®] (Behring, Germany) and switched to Enzygnost anti-HIV1/-HIV2[®] (Behring, Germany) for DD and was done throughout by AIDSDIA[®] (Dong-A, Korea) for VD. Confirmation of ELISA-positive sera was done by Biotech/Dupont HIV Western Blot kit[®] (Du Pont,Wilmington, U.S.A.). Antibody to hepatitis B core antigen (Anti-HBc) was not included in the donor screening since about half of the Korean donor population had the antibody.

The two groups of donors were analyzed by examining first-time donor percentages, age, sex, and test results. Proportion analysis based on the Z distribution and chi-square test with Yate's correction were used for statistical com-

parison of results.

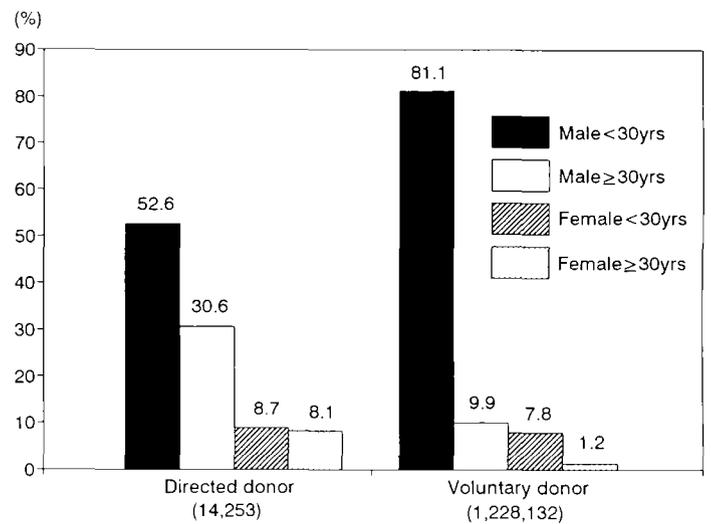


Fig. 1. Directed donors(DD) were older than voluntary donors(VD) and more women were recruited by DD program than were recruited by VD program. The two groups differed significantly in ages and in the percent of female donors versus male donors ($p < 0.01$). The proportion of first-time donors was 44.4% and 46.3% in DD and VD, respectively.

RESULTS

The age and sex distribution of DDs and VDs is shown in Fig. 1 and the frequencies of infectious disease markers in DDs and VDs in Korea for the period covered in the current study are shown in Table 1. Donors recruited by family and friends as DDs tended to be older than VDs. More women were recruited by family and friends than were recruited by the Korean Red Cross Blood Center. The proportion of first-time donors was 44.4% and 46.3% in DDs and VDs, respectively. The two groups differed significantly in ages, and in the percent of female donors versus male donors ($p < 0.01$).

Although small, it should be noted that there is a small fraction (15 out of 1,228,132) of Western blot confirmed HIV-infected donors among VDs while none are found among DDs. The frequency of HBsAg was higher in VDs ($p < 0.01$) and the frequencies of elevated ALT and VDRL were higher in directed donors($p < 0.01$) (Table 1). Some donors were positive for two or

Table 1. Positive rate of infectious disease markers in directed and volunteer blood donors in Korea

Infectious disease markers	Directed donors	Volunteer donors
HBsAg (+)*	603(4.2%)	63,661(5.2%)
Anti-HCV (+)	85(0.6%)	6,481(0.5%)
Elevated ALT(>45IU/L)*	1,261(8.9%)	68,378(5.6%)
VDRL (+)*	34(0.2%)	1,167(0.1%)
Anti-HIV1 (+)#	0 (0%)	15(0.001%)
Deferred donors* ^a	1,884(13.2%)	129,679(10.6%)
	14,253(100%)	1,228,132(100%)

* $p < 0.01$ between directed and volunteer donors

Western blot confirmed positive

^a Some donors were positive for two or more infectious disease markers

more infectious disease markers. On the whole, 1,884 (13.2%) of the DDs were deferred while 129,679 (10.6%) of the VDs were deferred ($p < 0.01$).

DISCUSSION

Since the first case of transfusion-transmitted AIDS by an ELISA-negative blood product was reported in Korea in 1989, the general public as well as the medical community in Korea have begun to pay keen attention to the safety of blood transfusion. Even though autologous transfusion has been advocated, only a limited number of patients are eligible for predeposit. The original DD program in Seoul National University Hospital was initiated in order to overcome a shortage of blood supply for transfusion. Interestingly, however, in recent years DD has been advocated in Korea by some as a way to procure safer blood.

It is heavily argued in Western countries that directed donation does not improve the safety of blood transfusion (Cordell *et al.* 1986; Kruskall and Umlas 1988; Collins and Churchill 1989; Kanter and Hodge 1989; Page 1989; Chambers *et al.* 1990). Most reports from United States discouraged the use of directed donor programs since the positive rate of infec-

tious disease markers were similar among DDs and VDs. But, several reports from different parts of the country advocated the use of directed donor programs because the positive rate of anti-HIV is significantly lower among DDs. The purpose of our work presented here was to obtain and analyze statistical figures regarding infectious disease markers in directed and voluntary blood supply in Korea in order to answer the question as to whether a DD program might confer any significant benefit in the prevention of transfusion-mediated diseases in a less individualized society where people are more open to exchange their medical and personal information.

The 5 infectious disease markers we have tested included AIDS, syphilis and various forms of viral hepatitis. In many Asian countries including Korea, the prevalence of viral hepatitis is much higher than in Western countries (Okochi *et al.* 1970; Beasley *et al.* 1982; Quak *et al.* 1982). Therefore, even prior knowledge about the medical history and private activities of a directed donor is not very useful in screening out donors with silent liver diseases with or without detectable hepatitis markers. In other words, a direct donation program does not seem to offer any advantage over voluntary donation approach.

In the case of AIDS, however, we found the following; First, most of the HIV-infected donors are associated with "risky" behaviors and such donors can be easily excluded from the DD program in a less individualized society such as Korea. Note that not a single HIV-infected donor was found among the DDs (Table 1). Second, it is certainly true that there exist some individuals with risky behavior who donate blood using the VD program just to find out if they are infected with HIV. Third, all of the HIV-positive donors found in Korea have been male and 80% of them were less than 30 years old. Since the proportion of that particular age and sex group is much higher among the VDs than among the DDs, DD program might be considered to offer less chance of contracting AIDS by blood transfusion. Fourth, although the

actual chance of contracting AIDS by blood transfusion is less than 1 in 500,000 blood transfusions in Korea, some patients simply feel better about the DD blood supply. The above facts advocate the use of a DD program for the prevention of transfusion-associated AIDS in Korea.

In conclusion, the DD program does not confer significant benefit in the case of viral hepatitis but seems to offer a certain degree of protection against the transmission of AIDS by blood transfusion in Korea. Hence, we believe that the establishment of a DD program is a matter that should be determined locally.

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