PREVALENCE OF HBsAG AND ANTI-HCV ANTIBODIES IN BLOOD DONORS OF THE AL-HASA REGION OF SAUDI ARABIA

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Hepatitis C virus (HCV) and hepatitis B virus (HBV) are the main causes of post-transfusion hepatitis.[1] HBV prevalence among blood donors in the UK and USA has been reported as 0.1-1%. A higher prevalence has been observed in southeastern countries.[2] In children, an HBV prevalence rate of 0.3% was reported after the mass vaccination program against HBV in Saudi Arabia.[3] The overall prevalence rate of anti-HCV antibodies among blood donors is 1.5% in Saudi Arabia,[4] which is lower than reported from other Middle Eastern countries.[5] The present study was undertaken to determine the prevalence of HBsAg and anti-HCV antibodies among blood donors in the Al-Hasa region of Saudi Arabia.

Patients and Methods

During the period of 1987-1999, 95,539 blood donors were screened for HBsAg at King Fahad Hospital, Al-Hofuf, Al-Hasa. All these donors were 17-55 years of age, with a body weight of more than 55 kg. They were carefully selected after a complete physical examination and answering the donor's questionnaire. Criteria for exclusion of donors was age less than 17 years or more than 55 years, body weight less than 55 kg, hemoglobin less than 13 g, history of jaundice, sickle cell disease, G6PD deficiency, diabetes, hypertension, history of recent fever, and a visit to a malaria-endemic area within one year. These donors were predominantly Saudi males. There were very few female donors who donated for their family members. The sex distribution of these donors was not known. At this time, non-Saudi donors were rarely allowed to donate for their families, however, in 1999 they were encouraged to start donating, in order to meet the increasing requirements of blood in the region.

HBsAg was tested by AUSZYME monoclonal enzyme immunoassay (Abbott Laboratories, USA). The beads coated with mouse monoclonal antibodies to HBsAg were incubated with donors' plasma, along with appropriate controls. HBsAg present was bound to solid phase antibodies. The unbound material was aspirated and the beads were washed. Mouse monoclonal antibody to HBsAg conjugated with horseradish peroxidase was allowed to react with antibody-antigen complex on beads. The unbound conjugate was aspirated and beads were washed. O-phenylenediamine solution containing hydrogen peroxide was added to the beads and after incubation development of yellow-orange color more than the cut-off value was taken as positive. The positive samples were confirmed by confirmatory neutralization enzyme immunoassay (Abbott Laboratories, USA).

Anti-HCV testing was introduced in 1992. From 1992-1999, 56,684 blood donors were screened for anti-HCV antibodies. Anti-HCV antibodies were tested by enzyme immunoassay (Murex Diagnostics, UK). The plasma samples were incubated in microwells coated with highly purified antigens containing sequences from core NS3, NS4 and NS5 regions of HCV. The anti-HCV antibodies were bound to the immobilized antigens. The unbound material was removed by washing. The captured anti-HCV antibodies were incubated with peroxidase-conjugated monoclonal antihuman IgG. After removal of excess conjugate the bound enzyme was detected by addition of tetramethylbenzidine and hydrogen peroxide. The development of purple color in excess of the cut-off value was taken as positive. Appropriate controls were included in the tests. All the positive samples were confirmed by immunoblot assay, Chiron RIBA HCV 3.0 (Chiron Corp., USA).

Results

Out of 95,539 blood donors tested during the period of 1987-1999, 3133 (3.27%) were HBsAg positive. The positivity rate was higher from 1987-1992 and a decline in HBsAg positivity was observed after 1992. Anti-HCV antibodies were positive in 561 out of 56,684 blood donors (0.98%) tested during the years 1992-1999. A rise in prevalence of anti-HCV antibody positivity was observed during this period. During 1992, anti-HCV antibody positivity was 0.75%, while it increased to 1.04% in 1999 (Table 1).

During the period of 1999, out of 5937 Saudi blood donors, 93 (1.56%) were HBsAg positive and 40 (0.67%) were anti-HCV antibody positive, while out of 933 non-Saudi blood donors, 20 (2.14%) were HBsAg positive and 32 (3.42%) were anti-HCV antibody positive (Table 2).

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TABLE 1. *HBsAg and anti-HCV antibody positivity among blood donors.*

Year	No. of donors	HbsAg No. positive	HbsAg Percentage	Anti-HCV positive No. positive	Anti-HCV positive Percentage
1987	7903	331	4.18	–	–
1988	7532	310	4.10	–	–
1989	7612	321	4.21	–	–
1990	7865	386	4.93	–	–
1991	7943	349	4.39	–	–
1992	6065	224	3.69	46	0.75
1993	6095	179	2.93	49	0.80
1994	7442	179	2.40	73	0.96
1995	7729	219	2.83	69	0.89
1996	7623	195	2.55	66	0.86
1997	7090	156	2.20	82	1.15
1998	7770	171	2.20	104	1.33
1999	6870	113	1.64	72	1.04
Total	95539	3133	3.27	561*	0.98

*Total donors treated for anti-HCV=56,684.

TABLE 2. *Prevalence of HBsAg and anti-HCV antibodies among Saudi and non-Saudi blood donors during 1999.*

	Saudi donors (n=5937)	Non-Saudi donors (n=933)
HBsAg positive	93 (1.56%)	20 (2.14%)
Anti-HCV positive	40 (0.67%)	32 (3.42%)

Discussion

The prevalences of anti-HCV antibodies among blood donors from India,[6] Pakistan,[7] and Singapore[8] have been reported to be 0.53%, 1.18% and 0.37%, respectively. In Saudi Arabia, anti-HCV antibody positivity among 0.9%-1.24% of blood donors has been reported.[2,4,9,10] Positivity of anti-HCV antibodies is much higher (24.5%) among the blood donors from other Middle Eastern countries.[5] In the present study prevalence of anti-HCV antibodies among Saudi blood donors in the Al-Hasa region was 0.67% and in non-Saudi blood donors was 3.42%. An increase in the prevalence of anti-HCV antibody positivity, from 0.75% in 1992 to 1.04% in 1999, was observed. This could be due to changing sensitivities of the reagents and kits used, as newer and more sensitive ones came into use. It could also be because of inclusion of non-Saudi family donors from the Middle Eastern region during the later part of the study, due to the increase in demand for blood in the region. The overall increase in prevalence of HCV antibodies in the Middle Eastern region has been observed.[1,11] In the present study, we also observed a higher prevalence of anti-HCV antibodies among non-Saudi donors during 1999. A prevalence of HBsAg positivity of 4%-5.2% among blood donors in Saudi Arabia has been reported.[2,12] In the present study, the overall prevalence of HBsAg positivity was 3.27%, which is lower than that reported from other regions. Among Saudi blood donors, the prevalence of HBsAg positivity was 1.56% and among non-Saudi blood donors, it was 2.14%. The prevalence of HBsAg positivity was not limited to any particular age group and was almost equally distributed among all the age groups of the donors. A decline in prevalence of HBsAg positivity was observed during the period of study. This could be the result of the mass immunization program against hepatitis B, adopted in Saudi Arabia since 1989, as well as greater awareness about HBV among health care staff and the public. It could also possibly be due to HBsAg screening of the adult population at the time of employment or admission to universities, and continuous screening of employees and health care staff. The HbsAg-positive population carries hospital cards and they are excluded from blood donation.

It appears from the present study that the overall prevalence of HBsAg positivity and anti-HCV antibodies in blood donors of the Al-Hasa region of Saudi Arabia is low, but this emphasizes the necessity of careful selection of blood donors and rigorous screening for HBsAg and anti-HCV antibodies by all blood banks to provide safe blood and blood components.

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