Prevalence of antibody to hepatitis C virus in Saudi blood donors

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B AL-KNAWY, AA EL-MEKKI, J HAMDI, R THIGA, A SHEIKHA. Prevalence of antibody to hepatitis C virus in Saudi blood donors. *Can J Gastroenterol* 1995;9(3):141-143. The prevalence of antibodies to hepatitis C virus (anti-HCV) was retrospectively determined using a second generation enzyme immunoassay in 3868 blood donors from the southern part of Saudi Arabia in an area with high prevalence of hepatitis B virus (HBV) infection. Of 3354 Saudis, 48 (1.43%) were seropositive for anti-HCV. A high prevalence (43 of 204, 21.08%) of anti-HCV was observed among Egyptian donors compared with Saudis (1.43%) and other nationalities (eight of 310, 2.58%). Furthermore, the prevalence of anti-HCV antibodies was observed to increase with age, peaking in the 25 to 34 year age group. From this and other studies conducted in different regions of Saudi Arabia, the prevalence of anti-HCV among Egyptian donors appears to range from 19.2 to 24.5%, and among Saudi donors appears to range from 1.00 to 1.7%, a rate similar to that reported from western countries; this latter rate does not seem to be influenced by the high prevalence of HBV infection in this region.

Key Words: Anti-hepatitis C virus, Blood donors, Saudi Arabia

Prévalence de l'anticorps anti-virus de l'hépatite C chez des donneurs de sang saoudiens

RÉSUMÉ : La prévalence des anticorps anti-virus de l'hépatite C (anti-VHC) a été identifiée rétrospectivement à l'aide d'un essai immunologique enzymatique de deuxième génération chez 3 868 donneurs de sang provenant de la partie méridionale de l'Arabie Saoudite, dans une région où la prévalence de l'infection au virus de l'hépatite B (VHB) est élevée. Quarante-huit Saoudiens sur 3 354 (1,43 %) se sont révélés séropositifs à l'égard de l'anti-VHC. Une prévalence élevée (43 sur 204, 21,08 %) des anticorps anti-VHC a été observée parmi des donateurs égyptiens en comparaison avec les Saoudiens (1,43 %) et autres nationalités (8 sur 310, 2,58 %). De plus, la prévalence des anticorps anti-VHC s'est révélée

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HEPATITIS C VIRUS (HCV) INFECTION accounted for about 70 to 90% of post-transfusion hepatitis before the recent introduction of mandatory testing of donated blood. The parenterally transmitted non-A, non-B hepatitis is caused, in the majority of cases, by a small single-stranded RNA virus closely related to flaviviruses, currently recognized as HCV.

The recent isolation of viral RNA from chimpanzees infected with hepatitis C led to the development of HCV testing using antibodies against recombinant antigens (1). The five antibody tests available include: ELISA I, which detects antibody against C-100-3; ELISA II, which detects antibodies against C-100-3, c-33c and c-22-3; recombinant immunoblot assay (RIBA) I, which detects antibodies against C-100-3 and 5-1-1; RIBA II, which detects antibodies against C-100-3, 5-1-1, c-33c and c-22-3; and RIBA III, which incorporates recombinant antigens derived from the NS5 region in addition to the antigenic components in RIBA II. Viral RNA is currently detected by polymerase chain reaction using CDNA primers from the highly conserved noncoding 5' region of HCV genome (2).

The routine policy of HCV antibody testing has reduced the incidence of acute post-transfusion hepatitis. The current risk of post-transfusion in hepatitis is about three for every 10,000

proportionnelle à l'âge, le maximum correspondant au groupe des 25 à 34 ans. À partir de cette étude, et d'autres menées dans différentes régions de l'Arabie Saoudite, la prévalence de l'anticorps anti-VHC parmi les donneurs égyptiens semble varier de 19,2 à 24,5 % et parmi les donneurs Saoudiens, semble varier de 1,0 à 1,7 %, soit un taux similaire à celui que l'on observe dans les pays occidentaux. Ce dernier taux ne semble pas être influencé par la prévalence élevée de l'infection au VHB dans cette région.

TABLE 1
Prevalence of antihepatitis C virus and hepatitis B surface antigen among blood donors by age group

Age group	Population	Anti-HCV (%)	HBsAg (%)
18-24	1540	0.97	4.29
25-34	1427	0.26	6.50
35-44	748	5.21	6.68
45+	153	5.23	10.46
Total	3868	2.56	5.82

HBsAg Hepatitis B surface antigen; HCV Hepatitis C virus

TABLE 2
Prevalence of antihepatitis C virus antibody by nationality

Nationality	# tested (% total)	# positive (%)
Saudi	3354 (86.71)	48 (1.43)
Egyptians	204 (5.27)	43 (21.08)
Others	310 (8.02)	8 (2.58)
Total	3868 (100)	99 (2.56)

units transfused, 0.75%/patient (3). The development of chronic liver disease following HCV infection is the highest among other viral causes of hepatitis. Chronic hepatitis develops in 62% of acute community-acquired hepatitis C cases and cirrhosis develops in 10 to 20% (4-6).

The prevalence of HCV antibodies in blood donors varies in different parts of the world: Germany, 0.24 to 0.79% (7); England, 0.5 to 1% (8); Italy, 0.87% (9); Spain, 1.2% (10); Japan 1.12% (11); and South Africa, 0.6 to 1.2% (12). In the Kingdom of Saudi Arabia, the prevalence of hepatitis C antibody among blood donors from the central part of Saudi Arabia is 1.00 to 1.24% (13,14). A prevalence of 1.7% has recently been reported in the Jeddah area among Saudi blood donors (13). The aim of this study was to determine the prevalence of HCV anti-

TABLE 3
Prevalence of antihepatitis C virus among positive Saudi blood donors by age group

Age group	Number positive (% of total positives)
18-24	14 (29.2%)
25-34	19 (39.6%)
35-44	11 (23.0%)
45+	4 (8.2%)
Total	48 (100%)

body in the southern part of Saudi Arabia, an area with the highest carrier rate of hepatitis B virus (HBV) (10%) and whether the prevalence of HCV antibodies was influenced by the higher prevalence of HBV infection.

MATERIAL AND METHODS

This study was conducted in Asir Central Hospital, the only centre in the region where HCV antibody testing is available. The authors retrospectively examined the blood bank records for a period of one year. All blood donors were unpaid male volunteers who appeared clinically healthy and gave no history of any predisposing risk factors to HCV infection such as use of intravenous drugs, homosexuality, previous history of blood transfusion, etc. Liver function tests were not performed. Donated blood units from 3868 individuals – 3354 Saudis (86.71%), 204 Egyptians (5.27%) and 310 other nationalities (8.02%) – were investigated. Each unit was tested for hepatitis B surface antigen (HBsAg) (Pasteur's kit, Sanofi Diagnostics Pasteur, Marnes La Coquette, France) and HCV antibody enzyme immunoassay II (Pasteur's kit), which detects antibodies to three different regions of HCV: C-100-3, c-33c and c-22-3. If the unit repeatedly tested positive, however, no

supplementary tests for anti-HCV were done. Blood units were also tested for human immunodeficiency virus (HIV) (Pasteur's kit), venereal disease and malaria. All assays were performed and evaluated according to the manufacturers' instructions.

RESULTS

The overall prevalence of anti-HCV antibodies and HBSAG among the different age groups in the population studied is shown in Table 1. Generally, seropositivity to HCV appears to increase with age. The prevalence rate of positive anti-HCV test by nationality (Table 2) is as follows: Saudis, 1.43%; Egyptians, 21.08%; other nationalities, 2.58%. Among the anti-HCV-positive Saudi nationals (Table 3), the peak of seropositivity (39.6%) seems to lie within the 25 to 34 year age group and subsequently declines to 8.2% in the 45 years and older age group. In the Saudi donor population studied, the prevalence of HBSAG is 4.0% (data not shown). Only one Saudi and one Egyptian were positive for both HBSAG and anti-HCV and none was HIV-positive. Donors with positive anti-HCV tests were not further evaluated to assess their liver disease status.

DISCUSSION

It has been a general policy in most, if not all, of the Saudi Arabian blood banks to screen for HCV antibody. In this study, we assessed the prevalence of HCV antibodies in apparently healthy male Saudi blood donors in southern Saudi Arabia; it was 1.43%, a figure similar to those obtained from other parts of Saudi Arabia, where the prevalence of HBV infection is relatively low. The high prevalence of HBV infection (10%) in the population did not seem to influence the prevalence of anti-HCV antibodies, which was found to be less than half that of HBSAG (1.43% versus 4.0%). (The data in Table 1 may not reflect the actual situation regarding HBV infection among Saudis since those younger than 18 years were not included in the study, in addition to the mixed nature of the population.) There were only two individuals (a Saudi and an Egyptian) who

were co-infected with HCV and HBV. These data confirm the studies by Hyams et al (15), who showed that the epidemiology of HCV differs significantly from that of HBV. It appears that these donors had the sporadic type of HCV virus infection and that their exposure to HCV seemed to increase with age, peaking in the 25 to 34 year age group. The decline in the prevalence of these antibodies in the older age group (Table 3) may only reflect the rela-

tively small number of donors in this age group. Therefore the prevalence of HCV seropositivity in Saudi Arabian blood donors seems to range from 1.00 to 1.70%, a rate similar to that reported from western countries.

In the present study we have shown a high prevalence of anti-HCV among Egyptian blood donors. This has also been observed in other parts of the Kingdom (16). Studies from Al-Baha have shown a prevalence of 22.7%

(personal communication). A higher figure (24.5%) has also been reported (17) among Egyptian blood donors from Jeddah. Furthermore, Egyptian volunteer blood donors in Riyadh had an anti-HCV positivity rate of 19.2% compared with Sudanese (1.9%) and Yemenis (2.4%) donors (9). The reason for the high prevalence of anti-HCV positivity among Egyptians is not clear and needs further investigations.

REFERENCES

1. Choo QL, Kuo G, Weiner AJ, Overby LR, Bradley W, Houghton M. Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome. *Science* 1989;224:362.
2. Kuo G, Choo QL, Alter HJ, et al. An assay for circulating antibodies to a major aetiological virus of human non-A, non-B hepatitis. *Science* 1989;244:362.
3. Donahue JG, Munoz A, Ness PM, et al. The declining risk of post-transfusion hepatitis C virus infection. *N Engl J Med* 1992;327:369-73.
4. Alter MJ. The natural history of community acquired hepatitis C in United States. *N Engl J Med* 1992;327:1899-905.
5. Koretz RL, Stone O, Mousa M, Gitnick GL. NANB post-transfusion hepatitis, a decade later. *Gastroenterology* 1985;88:1251-4.
6. Alter HJ. The consequences of non A, non B hepatitis. In: Seef LB, Lewis JH, eds. *Current Perspective in Hepatology*. New York: Plenum Medical Books, 1989:83-97.
7. Kuhl P, Seidl S, Stangel H, et al. Antibody to hepatitis C virus in German blood donors. *Lancet* 1989;ii:324.
8. Contreras M, Barbara JAJ. Screening for hepatitis C virus antibody. *Lancet* 1989;ii:505.
9. Sirchia G, Almini D, Bellobouono A, et al. Antibodies to hepatitis C virus in Italian blood donors. *Vox Sang* 1990;59:26-9.
10. Esteban JI, Esteban VC, Lopez-Talavera J, et al. Epidemiology of hepatitis C virus infection. In: Hollinger FB, Lemon SM, Margolis H, eds. *Viral Hepatitis and Liver Disease*. Philadelphia: Williams & Wilkins, 1992:413-5.
11. Tango T, Minegishi K, Mitsumori T, et al. Specificity and sensitivity of HCV antibody test in non-A, non-B hepatitis. *Nihon Rinsho* 1990;48:33-8.
12. Ellis LA, Brown D, Conradie JD, et al. Regional prevalence of hepatitis C antibodies in South Africa: an analysis of fresh and stored serum. In: Hollinger FB, Lemon SM, Margolis H, eds. *Viral Hepatitis and Liver Disease*. Philadelphia: Williams & Wilkins, 1992:445-7.
13. Bernvil SS, Andrew VJ, Karim A. Hepatitis C antibody prevalence in Saudi Arabian blood donors population. *Ann Saudi Med* 1991;2:563.
14. Facharzt MA, Facunle YM, El-Karamani WM, et al. Prevalence of antibodies to hepatitis C virus in blood donors in Riyadh. *Ann Saudi Med* 1991;2:501.
15. Hyams KC, Phillips LA, Moran AY, Tjeda A, Wignall FS, Escamillia J. Seroprevalence of hepatitis C antibody in Peru. *J Med Virol* 1992;37:127-31.
16. Saeed AA, Al-Admawa AM, Al-Rasheed A, et al. Hepatitis C virus infection in Egyptian volunteer blood donors in Riyadh. *Lancet* 1991;338:459-60.
17. Abdelaal M, Rowbottom D, Zawawi T, et al. Epidemiology of hepatitis C virus: a study of male blood donors in Saudi Arabia. *Transfusion* 1994;34:135-7.