ORIGINAL ARTICLE

The Prevalence of Anti-HCV Antibody in Risk Groups and Blood Donors

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Summary

Anti-HCV antibody was detected in 1.9% of the blood donors in University Hospital. Among the risk groups, 33.3% of the patients with post-transfusion hepatitis were tested positive for anti-HCV antibody. The anti-HCV antibody was detected in 30% of the IDU. Haemodialysis patients, patients with acute and chronic hepatitis and patients with liver cirrhosis appeared to have increased risk of Hepatitis C virus infection. The results indicate that the frequency of HCV infection increases with the exposure to blood or blood products.

Key Words: Hepatitis C virus, Anti-HCV antibody, Blood donors, Intravenous drug users, Post-transfusion hepatitis, Haemodialysis patients

Introduction

Hepatitis C virus (HCV) is now recognized as the primary cause of chronic post-transfusion hepatitis. It is associated with cases of sporadic hepatitis and chronic liver diseases[1]. The anti-HCV antibody can also be found in normal healthy blood donors[2].

Hepatitis C is a single-stranded RNA virus with a lipid envelope. A specific enzyme immunoassay (EIA) for this virus has been developed in 1989 by recombinant DNA technology after the scientists at Chiron Corporation isolated and cloned a fragment of Hepatitis C virus antigen designated C100-3. This enzyme immunoassay is used for the detection of antibody to hepatitis C virus. In the 2nd Generation HCV diagnostic kit, additional HCV antigens from the capsid C22-C and NS 3 (33C) the nonstructural region of the HCV genome are incorporated. This significantly improved the sensitivity of the assay and allowed earlier detection of seroconversion after infection.

The prevalence of anti-HCV has been reported in many countries and a substantial proportion of anti-HCV positive cases were found among patients with frequent parenteral exposure to blood such as haemophiliacs, intravenous drug users (IDU) and haemodialysis patients[1]. In Malaysia, the prevalence of anti-HCV antibody among blood donors was reported as 1.49% by Duraisamy *et al.*,[3] and 3% by Sinniah & Ooi[4]. The anti-HCV antibody among the IDU was 85.3% , and among the haemodialysis patients 53.9% of them had anti-HCV antibody[4]. The anti-HCV

antibody among the haemophiliacs and the thalassemias was 64.5%[4] and 5.8%[5] respectively.

The aim of this study is to investigate the prevalence of anti-HCV antibody among the risk groups and blood donors using 2nd generation anti-HCV diagnostic kits.

Materials and Methods

Blood donors: The screening of blood donors was conducted from March to May, 1992 in the Blood Bank, University Hospital. 504 serum samples were collected, stored and screened for anti-HCV antibody at intervals.

Risk groups: Five categories of patients: patients with liver cirrhosis, haemodialysis patients, hepatitis patients (inclusive of patients presenting with active and chronic hepatitis), intravenous drug users (IDU) and patients with post-transfusion hepatitis (PTH). This study was conducted from January 1991 to May 1992. The number of serum samples involved in each risk groups is summarized in Table I. All the sera were stored at -20°C and thawed only during the anti-HCV screening.

Detection of anti-HCV antibody: The Abbott HCV EIA 2nd Generation test kit was used to detect the anti-HCV antibody. The serum samples were diluted as required and the test procedures recommended by the manufacturer were strictly followed. The sera with absorbance value greater than or equal to the cut off-value were considered as reactive. Initially reactive sera were repeated and only repeatedly reactive sera were considered as positive for anti-HCV. No confirmation test was done on the positive sera.

Table I
Number of serum samples of high risk groups

Risk groups	No. of samples
Hepatitis patients	287
Patients with post-transfusion hepatitis	57
IDU	90
Haemodialysis patients	22
Patients with liver cirrhosis	25
Total:	481

Results

Anti-HCV antibody was detected in 108 of 985 (10.9%) of the serum samples in this study. The frequency of detection of anti-HCV varied with the categories of the persons tested. The rate of detection of anti-HCV antibody among the blood donors was 1.9% (10 of 504) of whom 5 were Malays and 5 were Chinese.

Among those at risk, anti-HCV antibody was highest among the patients with post-transfusion hepatitis. 33.3% (19 of 57) were found to have been infected by hepatitis C virus. Anti-HCV antibody was found in 27 of 90 (30%) IDU; the second most common risk factor for HCV infection. Eight per cent (2 of 25) of patients with liver cirrhosis were infected with HCV. The anti-HCV antibody was also found in 16.7% (48 of 287) of the patients with hepatitis. Among the haemodialysis patients, 9.1% (2 of 22) of them were found to have anti-HCV antibody (Table II).

Discussion

The study of the blood donors in the University Hospital showed that the prevalence of anti-HCV antibody was 1.9%. The prevalence rate of anti-HCV antibody from Blood Services Centre, Hospital Kuala Lumpur and Institute for Medical Research was 1.49% and 3%[3,4] respectively. Our findings and the results of the other two studies from two different centres indicate that the prevalence of the anti-HCV antibody among the healthy blood donors in Malaysia may be in the range of 1.5 to 3%.

The distribution of HCV is worldwide but with considerable geographical variation. In Taiwan, the prevalence of circulating anti-HCV antibody was 2% among the first time voluntary blood donors[6]. In France, the seropositive for hepatitis C virus antibody was 0.68% among the blood donors[7]. In

Table II
The prevalence of anti-HCV antibody in risk groups

Risk groups	Percentage anti-HCV detected (Number)
Hepatitis patients	16.7 (48/287)
Patients with post-transfusion hepatitis	33.3 (19/57)
IDU	30.0 (27/90)
Haemodialysis patients	9.1 (2/22)
Patients with liver cirrhosis	8.0 (2/25)

Germany, only 0.4% of the blood donors had the antibodies against the HCV[2]. In Spain, 1.14% of the blood donors were positive for anti-HCV antibody[1]. The prevalence rate among the blood donors was 0.47% in USA[8] and 0.06% in UK[9]. These results indicate that HCV antibody is markedly higher among Asian than Western countries. In a study by Van Der Poel *et al.*,[10] in the Netherlands, they reported that the prevalence of anti-HCV antibody among the blood donors of Dutch origin was 0.69%, however, the rate of prevalence of the anti-HCV antibody among the blood donors from Surinam was 5.2%, which is 7 times higher. This finding appears to indicate that HCV and HBV could have similar endemic areas.

In a community survey of 4000 people, the Hepatitis B virus (HBV) infection (HBsAg positive and anti-HBs $\geq$ 10 mIU/ml without vaccination) was about 8% with the prevalence of HBsAg among Chinese being 4.8% compared to 2.1% among the Malays (unpublished data). Our results have shown that the prevalence of anti-HCV antibody among blood donors was 1.9% which is higher than the blood donors in Western countries. Although simultaneous HCV and HBV infections among the blood donors require further study, Fong *et al*[11] and Sheen *et al*[12] reported that the relative risk of development of hepatocellular carcinoma increased with HBV and HCV coinfection. Our findings and the reports by Duraisamy *et al*[3] did not show any significant difference among the different ethnic groups.

The history of our HCV seropositive blood donors was not available and the modes of transmission of HCV infection was not clear. Maclennan *et al.*,[9] reported that experience with intravenous drug use appeared to be the predominant risk factor among the HCV seropositive blood donors. In our study, 27 (30%) of the 90 IDU were found to be anti-HCV positive; this is consistent with the results of other studies, implicating intravenous drug use as the single most important risk factor of acquiring HCV infection among the non-medical patients i.e. non-blood or blood products dependent patients. The risk of sexual transmission of HCV is absent or very low[13]. Other risk factors for the transmission of HCV include tattooing and ear-piercing.

The high frequency of anti-HCV antibody among the patients with post-transfusion hepatitis was not unexpected. Nineteen (33.3%) of the 57 patients with post-transfusion hepatitis were positive for anti-HCV. The important finding of this study is the high prevalence of anti-HCV among the patients with hepatitis. Forty-eight (16.7%) of the 287 patients with hepatitis were positive for anti-HCV antibody. It is well known that HCV is associated with chronic and often progressive liver disease and there is evidence that human recombinant Interferon-Alpha is able to suppress HCV RNA in the serum and improve serum aminotransferase activities in patients with chronic hepatitis C infection[14,15,16]. Therefore, the high frequency of HCV infection among these patients should influence the management and the screening of anti-HCV antibody at intervals may be mandatory in the routine evaluation of these patients.

Routine screening of blood donors for anti-HCV antibody will certainly reduce the incidence of post-transfusion hepatitis caused by HCV, but the presence of anti-HCV antibody may not indicate the true frequency of infection because the current diagnostic assay has its limitations. There is a long incubation period between exposure to HCV and the detection of the antibody. The anti-HCV antibody may appear considerably late and disappear with time[17].

In conclusion, the prevalent rate of anti-HCV is high among blood transfusion dependent patients. Routine screening of the anti-HCV antibody in the Blood Bank may be necessary to protect patients from HCV infection.

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