

Hepatitis B or Hepatitis C: The Bigger Threat in Multiple Infected HIV Positive Blood Donors

NEHA AGARWAL, USHA DUBEY, ASHA AGARWAL, RIDDHI JAISWAL

ABSTRACT

Aim: To study the prevalence of hepatobiliary co-infections – Hepatitis B (HBV) and Hepatitis C (HCV) in Human Immunodeficiency Virus (HIV) positive voluntary and replacement blood donors in the blood bank of a tertiary health care centre.

Methods: 2,48,387 donors were screened for HIV, HBV and HCV co-infections from 1999 to 2010 by using commercially available ELISA kits.

Results: The results were as follows:

- The total number of donors who were studied from 1999 to 2010 – 2,48,387
- HIV positive cases – 273 (0.11%)

The HCV co-infection was detected in 30/273 (10.99%) HIV positive donors, while the HBV co-infection was found in 6/273 (2.19%) donors. 5/273 (1.83%) HIV positive donors tested positive for both HBV and HCV.

Conclusion: The implication of HCV and/or HBV co-infection in apparently healthy HIV positive blood donors is of utmost importance as they mostly lie within the reproductive age group of 21-40 years. The knowledge of the co-infection in such cases is vital due to the increased risk of the sexual and perinatal transmission of the hepatitis virus along with increased hepatotoxicity with antiretroviral therapy and rapid progression to cirrhosis and hepatocellular carcinoma.

Key Words: Co-infection, HIV, HBV, HCV, blood donors, voluntary

INTRODUCTION

The transfusion of blood and blood products is a life saving measure but at the same time, the transfusion of infected blood or one of its components carries a significant risk of the transmission of many blood transmitted diseases like HIV, HBV, HCV etc. which do not have any specific treatment and are potentially life threatening.

The diagnosis of the HIV infection depends upon the demonstration of the antibodies to HIV or the direct detection of HIV or its components. The antibodies to HIV generally appear in the circulation 2 to 12 weeks following infection with the virus.

A diagnosis of the HBV infection can be made by the detection of HBsAg in the serum even before the elevation of serum aminotransferases or the appearance of clinical symptoms.

A specific serological diagnosis of Hepatitis C can be made by demonstrating the presence of anti HCV antibodies in the serum. However, the assays of HCV RNA are the most sensitive tests for HCV infection. The HCV RNA can be detected before the acute elevation of aminotransferases and before the appearance of anti HCV antibodies in patients with acute Hepatitis C. Hepatobiliary diseases are a major cause of morbidity and mortality in HIV infection-predominantly being a reflection of the problems which are encountered in the setting of Hepatitis B or Hepatitis C.

We studied the prevalence of HIV, HBV and HCV in both replacement and voluntary blood donors, along with the prevalence of HBV and HCV co-infection in multiple infected HIV positive donors from the year 1999 to 2010, in the blood bank of a tertiary health care centre.

MATERIAL AND METHODS

The present study was conducted at the blood bank of a tertiary health care centre from January 1999 to December 2010.

By using a standard protocol for donor selection, 2,48,387 donors were screened for HIV, HBV and HCV viral markers. The detection of these viral markers was done by employing commercially available kits which were developed by J Mitra and Co.

The detection of antibodies to HIV 1 and/or HIV-2 was done by Microlisa – HIV based on Indirect ELISA. The absorbance was read at 450 nm. The cutoff value was determined by adding the mean negative control (NC \bar{X}) and mean positive control (PC \bar{X}) and by dividing the sum by 6.

$$\text{Cut off value} = \frac{\text{NC}\bar{X} + \text{PC}\bar{X}}{6}$$

HBsAg detection was done by the Hepalisa technique which was based on the "Direct Sandwich" principle. The cut off value was determined by NC \bar{X} + 0.1.

Similarly, for the detection of anti HCV antibodies, HCV Microlisa technique was employed. The cutoff value was determined by 0.1 × PC \bar{X} + 0.1.

All the test specimens with an absorbance value which was greater than or equal to the cutoff value were considered to be reactive.

OBSERVATION

This study involves tests which were done on 2,48,387 donors from 1999 to 2010. The results were as follows :

Total number of HIV positive donors in 1999-2010 = 273

Year	Total Number of Donors subjected to tests	HIV positive	HBV positive	HCV positive
1999	8841	11 (0.12%)	126 (1.43%)	37 (0.42%)
2000	8943	10 (0.11%)	113 (1.26%)	36 (0.40%)
2001	10,647	22 (0.21%)	191 (1.79%)	33 (0.31%)
2002	13628	16 (0.12%)	294 (2.16%)	46 (0.34%)
2003	17865	31 (0.17%)	328 (1.84%)	54 (0.30%)
2004	17856	16 (0.09%)	261 (1.46%)	68 (0.38%)
2005	21452	27 (0.13%)	384 (1.79%)	107 (0.50%)
2006	24714	24 (0.10%)	432 (1.75%)	111 (0.45%)
2007	27325	19 (0.07%)	483 (1.77%)	108 (0.40%)
2008	29539	32 (0.11%)	514 (1.74%)	115 (0.39%)
2009	32153	29 (0.09%)	536 (1.67%)	131 (0.41%)
2010	35424	36(0.10%)	610(1.72%)	148(0.42%)
Total	2,48,387	273 (0.11%)	4272 (1.72%)	994 (0.40%)

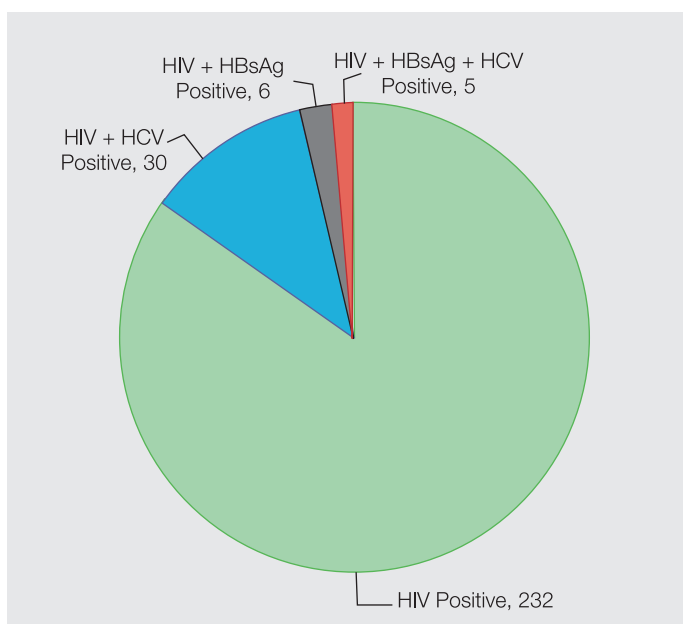
[Table/Fig-1]: Yearly data of HIV, HBV and HCV positivity

Number of donors who tested positive for both HIV and HCV	=	30
Number of donors who tested positive for HIV and HBsAg	=	06
Number of donors who tested positive for HIV, HCV and HBsAg	=	05

DISCUSSION

Though recognised as an emerging disease only in the 1980s, AIDS by now has been established throughout India. During the year 2005, the number of HIV positive cases rose to 5.2 million [1]. The situation looks more dreadful when we broaden our outlook globally. The south-east Asian region saw the number of HIV/AIDS positive patients rising to 7.2 million in December, 2006 [1].

The diseases of the hepatobiliary system pose a major problem in patients with HIV infection. Among the HIV infected patients, 2-4 million are estimated to have chronic HBV infection, while 4-5 million are estimated to be co-infected with HCV [2]. Literature on the prevalence of HIV co-infection with HBV and or HCV in India is sparse [3].



[Table/Fig-2]: Prevalence of hepatobiliary co-infections in 273 HIV positive donors

There is an associated increase in liver related mortality in patients with HIV and active HBV infection as compared to the rates in patients with either infection alone. A reduced survival rate with a higher rate of hepatic decompensation and chronic viral liver disease among the co-infected patients has been reported [4].

The presentation of HCV can vary from a carrier state with a normal liver biopsy to an abnormal liver histology in HCV RNA positive patients with normal serum aminotransferases. In Hepatitis C, cirrhosis can develop in as many as 20% of the patients within 10-20 years of having the acute form of the illness [5].

Patients who are co-infected with HIV have an increased risk of HCV disease progression to cirrhosis and hepatocellular carcinoma. In a study which was conducted by Valdez H et al, it was concluded that an inadequate lymphocyte response to the HCV antigens in HCV infection was potentiated by HIV, resulting in a failure to control HCV propagation [6]. Patients with HIV/HCV co-infection have higher serum HCV viral loads than patients with HCV mono infection [7]. HCV has been detected in the semen of co-infected men and in the genital tracts of co-infected women [8,9]. Among the co-infected women, the risk of the perinatal transmission of HCV is approximately 17% or four to five times greater than the risk among women who are infected with the HCV mono-infection [10, 11].

In the present study, we found that though the total number of 4272 (1.72%) HBV positive cases were more than either HIV positive (273) (0.11%) or HCV positive patients -994 (0.40%) alone. Out of the 273 HIV positive donors, 30 tested positive for both HCV and HIV (10.99%), 6 tested positive for HBV and HIV (2.19%) and 5 tested positive for all the viral markers (1.83%). Thus, we conclude that HCV is more commonly associated with HIV, which is in concordance with the study which was conducted by Ahsan et al [12]. They tested 200 serum samples from HIV positive patients who were admitted to the hospital. Out of the 200 HIV positive sera which were tested, 7 (3.5%) were HBs Ag positive and 16(8%) were anti HCV positive.

Saravanan et al screened five hundred HIV infected patients for hepatitis B virus and hepatitis C virus in 2007 [3]. HBV co-infection was detected in 9% of the patients, while HCV co-infection was detected in 2.2% of the patients. The low incidence of the HCV infection could be due to the low incidence of intravenous drug use and infrequent transfusion in this study group [3].

	HIV positive number of cases)	HBV & HIV positive (%)	HCV & HIV positive (%)
Present study	273	2.19	10.99
Ahsan et al	200	3.5	8.0
Saravanan et al	500	9.0	2.2

[Table/Fig-3]: Comparison between present study and other studies

However, Mehta et al studied 28,995 blood samples from blood donors in Rajasthan [13]. 81 (0.27%) of the samples tested positive for HCV, while only 1 (1.2%) donor tested positive for both HCV and HIV.

Amongst the studies which were conducted abroad, the prevalence of HCV/ HIV co-infection in 6154 blood donors at the National Blood Transfusion Centre at the Kenyatta National Hospital was found to be very low at 0.02 by Karuru et al [14].

Since the present study involved healthy asymptomatic donors who were within the reproductive age group of 21 - 40 years, the HIV positive partners of the individuals with HCV infection should be counselled about the risk of sexual and perinatal transmission of the virus. Also, there exists an important association between HIV and hepatitis C virus, such as hepatotoxicity with the antiretroviral therapy and the more rapid progression to cirrhosis and hepatocellular carcinoma. As such, more concern towards the surveillance and prevention of this relatively more prevalent pattern of co-infection in HIV positive cases is needed in this region.

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