



Prevalence of Hepatitis C Virus Seropositivity among Blood Donors in a Tertiary Care Hospital

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Abstract

Hepatitis C Virus (HCV) is a major cause of post transfusion hepatitis. Seropositivity of HCV among blood donors varies from 0.53%-5.1% in different parts of India. The aim of study is to see the prevalence of anti HCV antibodies among healthy blood donors in Punjab. This retrospective analysis included blood donor screening data from January 2009 to December 2013 (5 years). Donor samples were screened for anti-HCV antibodies by ELISA using HCV UTRA HEPNOSTIKA KIT, Biomerieux, France. Analysis of seropositivity in replacement and voluntary blood donors were compared using the Pearson Chi-Square test. Of the total 1, 56,695 blood units screened, 1.45% (n=2286) were found to be reactive for anti HCV antibodies. The seropositivity of HCV varied from 1.13% to 1.74%. Out of the total blood donors' positive for anti-HCV antibody, 68.8% were replacement and 31.2% were voluntary and statistically significant ($p < 0.05$). The screening of blood products is the only way for preventing the transfusion associated cases of hepatitis. The introduction of donor counseling, screening for different pathogens and donors self exclusion and ensuing a 100% voluntary blood donation will be effective in decreasing the hepatitis rate.

Keywords: Transfusion, transmitted infections, hepatitis C virus, sero prevalence.

Introduction

HCV was first detected in 1989, belongs to the Flaviviridae family and it is a globally prevalent pathogen and a leading cause of death and morbidity¹. It is estimated that 2% of the world's population have chronic HCV infection with 170 million persons chronically infected with the virus and 3 to 4 million persons newly infected each year².

HCV infection can be determined by detecting HCV antibodies using enzyme linked immuno sorbent assay (ELISA) which has sensitivity ranging from 99 to 99.9% and shortens the pre-seroconversion window period to 58-60 days. Although technological advancement have led to the development of more sensitive methods to detect HCV such as NAT which decreases the window period to 2-3 days but prevalence of asymptomatic carriers, genetic variability in viral strains and technical error remains which leads to transfusion of HCV.

Blood transfusion is an effective mode of transmission of HCV infection as it allows a large quantum of infective virions into the susceptible patient. The long term effect of blood transfusion is more evident in patients with thalassemia, hemophilia and cancer who are usually multiple transfused and at higher risk for acquisition of HCV. HCV is a major concern to the patients, physicians and policymakers who wish to see a risk free blood supply.

The aim of this study is to access the seroprevalence of anti HCV antibodies in the blood donor population.

Material and Methods

A retrospective study was performed at Department of Immunohaematology and Blood Transfusion from January 2009 to December 2013 over a period of five years. A total of 1, 56,695 blood donations collected over this period and the donors were either voluntary or replacement donors. Donors were screened by the trained medical staff and consent was obtained prior to donation. All samples obtained at the time of blood donation were screened for various markers of TTIs including HCV by Elisa. Donor samples were screened for anti-hepatitis C Virus antibodies by HCV Ultra Hepanostika kit, Biomerieux, France. Analysis was conducted using SPSS for windows (version 20.0) SPSS Inc., Chicago IL, USA. Discrete categorical data were presented as n (%). For categorical data, comparisons were made using Pearson chi-square test.

Results and Discussion

Out of the total 1,56,695 blood donors screened 107886 (68.8%) were replacement and 48809 (31.2%) were voluntary as shown in table-1. 2286 donors were found to be reactive for anti HCV antibody, giving an overall seropositivity of 1.45% in our donor population and seropositivity of HCV varied from 1.13% to 1.74% in the last 5 years as shown in table-2. The seroprevalence of anti HCV antibodies in voluntary blood donors was 0.27 % (n=432) while in replacement blood donors was 1.18% (n=1854) and year wise change in the hepatitis C prevalence had declined over the year and it was statistically significant ($p < 0.05$).

Hepatitis C infection is spreading fast in India. Over one lakh people get infected by the deadly HCV virus every year³. The seroprevalence rate of HCV among the blood donor population in India is 0.53 to 5.1%⁴. HCV is an etiological agent in about 20% of the patients with chronic hepatitis in northern India⁵. Transfusion associated hepatitis has been reported to occur in 2.5 to 15% of patients who receive transfusions⁶. Various studies have been compared which have been done in different parts of India showing prevalence of HCV as shown in table-3⁷⁻⁹, but in our study anti HCV seropositivity was 1.45% among healthy blood donors of Punjab. HCV seropositivity in the western part of India has been reported between 0.34 to 2.5%^{10,11} and another study done in Hissar, Haryana, the seroprevalence of anti-HCV antibodies was 1%¹². A study done in Orissa reported anti HCV seroprevalence to be 1.98%¹³. In Pakistan seroprevalence of hepatitis C virus antibodies among healthy blood donors varies from 0.27% to 6.8%¹⁴. In India, hepatitis C infection is one of the major blood borne diseases and a leading cause of chronic hepatitis and about 12000 individuals die each year from HCV associated chronic liver disease¹⁵. The World Health Organization estimates that the world wide prevalence of HCV infection is approximately 3%¹⁶. The seroprevalence rate of anti HCV in our study has been reduced markedly. This variation is attributed to effectiveness of donor screening to exclude donors with a history of high risk behavior, pre-donation counseling and self deferral by donors and level of awareness among blood donors. HCV seropositivity was found to be lower in our voluntary donors as compared to replacement donors who are similar to another Indian study¹⁷. In India, voluntary donors are safer than replacement donors because they are invariably more educated and can better understand the implication of donor questionnaire. Replacement donors on the other hand, give blood under compulsion and thus conceal answers related to their health and sexual habits. The seropositivity in our study is comparatively higher than other studies done due to malpractice among medical community such as reuse of syringes, not using properly sterilized medical instruments by dentists, reuse of contaminated razors by barbers. It is essential to follow up the anti HCV reactive blood donors on two accounts, First for permanent deferral for blood donation and secondly for early management of HCV infection. People with known HCV infection should be counseled regarding ways to reduce the risk of transmitting HCV to others, and means of minimizing their risk for HCV related complications.

Table-1
Frequency of voluntary and replacement donors

Year	Total Blood Donors	Voluntary Donors	Replacement donors
2009	29234	6727	22507
2010	34544	8758	25786
2011	32015	9215	22800
2012	30804	13102	17702
2013	30098	11007	19091
Total	156695	48809 (31.2%)	107886 (68.8%)

Table-2
Seropositivity of anti-HCV antibodies among blood donors

Year	Voluntary (%)	Replacement (%)	Total (%)
2009	60 (0.20%)	411 (1.41%)	471 (1.61%)
2010	78 (0.22%)	525 (1.52%)	603 (1.74%)
2011	101 (0.32%)	336 (1.05%)	437 (1.37%)
2012	99 (0.32%)	333 (1.08%)	432 (1.40%)
2013	94 (0.31%)	249 (0.82%)	343 (1.13%)
Total	432 (0.27%)	1854 (1.18%)	2286 (1.45%)

Table-3
Comparison of various studies

Place	Study period	No. of donors	Prevalence of HCV
Makroo et al ⁷ , New Delhi	2001-2011	206022	0.39%
Bhawani et al ⁸ , Andhra Pradesh	2004-2009	8067	0.84%
Kaur et al ⁹ , Punjab	2005-2011	35793	1.38%
Present Study	2007-2013	156695	1.45%

Conclusion

Prevention is the only effective cure which is available at present for the HCV infection and so in such scenarios, propaganda and education of the masses regarding the prevention and the consequences of acquiring the HCV infection becomes extremely important. This increasing trend should be considered seriously and alarming bells should be raised by the health authorities. The screening and the treatment of blood products is the only way for preventing the transfusion associated cases. The introduction of donor counseling, screening for different pathogens and donors self exclusion and ensuring a 100% voluntary blood donation will be effective in decreasing the hepatitis rate. The results of these studies will help in improving the standards of the blood banking systems in India and long term strategies can be made to improve the public health and to decrease the transmission of this deadly virus. Efforts should be made to increase and retain the young motivated voluntary donors to maintain safe blood supply.

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