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Original Research Article

Prevalence of Transfusion Transmitted Viral Diseases among Blood Donors in MGM Medical College, Aurangabad, Maharashtra

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ABSTRACT

Background: Transfusion transmitted infections (TTIs) are a major problem associated with blood transfusion practices. Hepatitis C virus (HCV), human immunodeficiency virus (HIV) and hepatitis B virus are the three most important agents responsible for transfusion transmitted diseases. Others are HDV, CMV, EBV, HPV, Parvo virusB19, HTLV and CJD which can be transmitted by transfusion of blood or its component.
Aim: The aim of our study is to know the prevalence of transfusion transmitted viral diseases among blood donors in MGM Medical College from Jan 2007 to Dec2011.
Setting and design: The present study was carried out in MGM Medical College, Aurangabad and it was a retrospective study. Data collected from Jan 2007 to Dec2011, a five year study.
Materials and methods: This was a retrospective study from January 2007 to December 2011 which was conducted at the blood transfusion centre of MGM Institute of Medical science and research centre, Aurangabad, Maharashtra, India. Donors were evaluated for the prevalence of HCV, HBS Ag and HIV. Donors were selected according to WHO manual of transfusion medicine. Professional donors were rejected. All the samples were screened by third generation ELISA Kits for HIV, HBS Ag and HCV.
Statistical Analysis used: Chi square test.
Results: A total number of 10,549 healthy blood donors were tested, out of which 9987 (94.67%) were voluntary donors and 562 (5.32%) were replacement donors. The proportion of replacement donors was significantly low ($p<0.001$).Males formed the major bulk of the donor population accounting for 9814(93.03%) and females were 735(6.96%). The prevalence for HIV, HBS Ag and HCV was 16(0.15%), 163(1.5%), 25(0.2%) respectively. There was an increasing trend in HBS Ag, HCV seropositivity among blood donors and it was statistically significant. ($p<0.001$)
Conclusion: In our retrospective study (2007-2011) of 10549 donors at MGM Medical College, Aurangabad, Maharashtra, India, voluntary donors formed the main bulk and it was found that there was increasing trend in the seroprevalence of TTIs over the past five years.
Keywords: Blood transfusion, HIV, HBS Ag, HCV, Transfusion Transmitted Infections (TTI),

Key messages:

1. Proper donor selection and counseling should be done to reduce transmission of TTI.
2. Use of fourth generation and newer techniques should be done for reducing risk for transfusion transmitted diseases.
3. Introduction of nucleic amplification testing techniques for reducing TTI.

Key words: HIV, HBS Ag, HCV, Transfusion Transmitted Infections (TTI), NAT (Nucleic amplification technique)

INTRODUCTION

Hepatitis C virus (HCV), human immunodeficiency virus (HIV) and hepatitis B virus are the three most important viral agents responsible for transfusion transmitted diseases. Others are HDV, CMV, EBV, HPV B19, HTLV and CJD can be transmitted by transfusion of blood or its components. [1,2] The past several decades have witnessed great advantage in techniques of detecting these TTIs. With the advent of nucleic acid amplification technique (NAT), western countries have decreased the risk of TTIs to a major extent. Despite this dramatic progress, India is far from achieving a "zero risk" blood supply .Amongst the infections, HIV and hepatitis are the commonest to occur in the window period which is often negative. With the advent of component single donor bag for 2-3 recipients, there is possibility of one positive infecting 2-3 persons. [3,4] In the present study we attempted to assess the prevalence of markers of HCV,HIV and HBV in our donor population, and their trends over a period of 5 years(2007 -2011).

MATERIAL AND METHODS

In this retrospective study, we reviewed 10,549 healthy blood donors over a period of five years (2007 -2011) from the records of blood bank at MGM Medical College. In our study majority of donors were voluntary and replacement donors were either relatives or friends of the patient concerned .Donors were selected and screened thoroughly, as per the guidelines of WHO manual of transfusion medicine. [5] Professional blood donors and those with previous history of jaundice were excluded.

All the 10,549 donor serum samples were screened for HBV, HCV and HIV. Hepatitis surface antigen (HBS Ag) was screened using third generation ELISA kits (Hepalisa; J Mitra and Co. Pvt Ltd., New Delhi, India), with reported sensitivity and specificity of 100% each (as per manufacturer`s manual). HCV was screened using third generation ELISA kits(HCV microlisa; J Mitra) with reported sensitivity and specificity of 100 and 97.4% respectively.HIV was screened by third generation ELISA kits(HIV microlisa; J Mitra) with reported sensitivity and specificity of 100% each. Tests were performed according to manufacturer`s instructions.

Statistics: Chi square test was used and p value was calculated.

RESULTS

Data retrieved was tabulated annually and statistical evaluation was performed. Out of the total 10,549 blood donors, 9814 were males (93.3%) and 735(6.96%) were females (males: females ratio, 13.3:1) (Table 1).In the evaluation of data, we found that out of the total10, 549 healthy blood donors, 9987(94.67 %) were voluntary donors and 562 (5.32%) were replacement donors. The total number of blood donations in the blood bank showed a progressive increase from 484 donors in2007 to 3630 donors in 2011(Table 1).On statistical analysis, the proportion of

replacement donors was found to be significantly low($p < 0.001$).

Table 1: Total blood collection and sex wise distribution. (Age, 18-60 years)

Year	Total	Replacement (%)	Voluntary (%)	Males (%)	Females (%)
2007	484	107(22.1)	377(77.8)	443(91.5)	41(8.47)
2008	1069	32(2.99)	1037(97)	1020(95.4)	49(8.16)
2009	1922	59(3.06)	1863(96.9)	1765(91.83)	157(8.16)
2010	3444	189(5.48)	3255(94.51)	3169(92.01)	275(7.98)
2011	3630	175(4.82)	3455(94.13)	3417(94.13)	213(5.86)
Total	10549	562(5.32)	9987(94.67)	9814(93.03)	735(6.96)

We evaluated the annual prevalence of HCV, HIV and HBS Ag in the blood donors at our tertiary care centre. The prevalence of HBS Ag was observed to range from 0.61% in 2007 to 1.68% in 2011.Anti HCV prevalence was 0 % in2007 and 0.16% in 2011.HIV prevalence was observed to range from 0% in 2007 to 0.05% in 2011.The overall prevalence of HCV, HBS Ag and HIV in donor population in our study group was 0.2, 1.5 and 0.15 respectively. There was an increasing prevalence for seropositivity for HBS Ag and HCV over the past five years and was statistically significant ($p<0.001$) (Table2).

Table 2: Prevalence of HBS Ag, HCV and HIV in blood donors

Year	Total donors	HBS Ag	HCV	HIV
2007	484	3(0.61)	0	0
2008	1069	10(0.93)	6(0.56)	3(0.28)
2009	1922	25(1.30)	1(0.05)	3(0.15)
2010	3444	55(1.59)	11(0.3)	7(0.2)
2011	3630	70(1.9)	6(0.16)	2(0.05)
Total	10549	163(1.5)	25(0.2)	16(0.15)

DISCUSSION

Blood transfusion is a significant route of transmission of infectious diseases .Among all viral infections, HIV and Hepatitis are very dangerous. In the present study, an analysis of donor profile and estimations of prevalence of HIV, HCV and HBV were attempted. Replacement donors constitute the largest group of blood donors in India. [6] In contrast; in our study we found voluntary donors formed the major bulk. In a study by Singh et al. [7] 82.4% of their donors were replacement donors; in Kakkar et al. [8] 94.7% of the donors were replacement.

The seroprevalence of HCV in our study was 0.2% (ranging from 0% in 2007 to 0.16% in 2011).The wide variation of HCV seroprevalence in different studies in India [9-16] might be due to use of different generations of ELISA test kits, having different sensitivities and specificities. Garg et al [9] reported an HCV prevalence of 0.28% in blood donors in western India; Sood et al. [11] reported a prevalence as high as 2.5 % in Delhi; Kaur et al. [13] reported a prevalence of 0.78%. Singh et al [15] documented 0.5% HCV seroprevalence while Jain et al. [14] reported a prevalence of 1.57% in New Delhi`s voluntary donors.

Prevalence of HBS Ag in our blood donor population was found to be relatively higher (1.5%). India has been placed in the intermediate zone of prevalence of hepatitis B by World Health Organisation (2-7%). [16] Lodha et al. [17] reported a prevalence rate of 1-2 %; Singh et al. [15] reported of 1.8 % whereas Joshi and Ghimere [18] reported a prevalence of 2.71% in healthy donors. Our study is in general agreement with studies by Singh et al. [15] India is still in the intermediate prevalence zone for HBSAg and has been estimated to be home to over 40 million HBSAs carriers. [19] Despite the fact that a safe and effective vaccine has been available since 1982, [20] the HBSAg

prevalence in India remains high. This is mainly because hepatitis B vaccination is not a part of our national immunization programme.

For HIV, India is second only to South Africa in terms of overall number of people living with HIV. The Indian National AIDS Control Organisation suggested an overall prevalence of 0.91% (2005) and 0.25% in Delhi. [21] West India has reported a prevalence of HIV of 0.47% [22] while that in Punjab is 0.26%. [13] Sonawane et al [10] reported a prevalence of 1.83% in rural population. The present study showed an HIV seroprevalence of 0.15% (0 % in 2007 to 0.05% in 2011).

CONCLUSION

In our retrospective study (2007-2011) of 10549 healthy blood donors at a tertiary care centre in Aurangabad, India, we estimated an overall prevalence of HCV, HBS Ag and HIV to be 0.2, 1.5 and 0.15% respectively. In spite of voluntary blood donor selection in our study, there is an increasing trend in HBSAg and HCV infections over the past five years. This could be due to lack of awareness of vaccination programme since hepatitis vaccination is not a part of our vaccination programme. With newer techniques like Nucleic acid amplification, the transmission of TTI`s can be reduced. NAT is a direct method of testing blood which detects the viral RNA or DNA unlike the serological tests that require the presence of antibodies to trigger a positive test result.By decreasing the window period, it allows for earlier detection of viral infection and thus decreases the window period and decreases the possibility of transmission via transfusion. The window period for HIV, HCV and HBV are reduced from 20.3, 58.3, 53.3 to 5.6, 4.9 and 35.4 days respectively. TTIs have a profound multidimensional impact on development of countries. Thus proper predonation screening of blood donor and postdonation testing of blood bag by newer techniques should be done to minimize transfusion transmitted diseases.

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