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ORIGINAL ARTICLE

SEROPREVALENCE OF TRANSFUSION TRANSMITTED INFECTIONS IN A TEACHING HOSPITAL BLOOD BANK

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ABSTRACT: BACKGROUND: Blood transfusion is a life-saving procedure. However, the recipient has the potential risk of acquiring transfusion-transmissible infections (TTI), important infectious agents being Human Immunodeficiency Virus (HIV), Hepatitis B & C viruses, and Treponema pallidum. **AIM:** This study was undertaken to know the prevalence of TTI in our hospital blood bank and hence evaluate the safety of the blood units. **MATERIAL AND METHOD:** The present study was conducted at the Blood Bank of our Medical College Hospital. Data was collected retrospectively for a 4.5-year period from January 2008 to June 2012. Donor data including demographic details and results of the screening tests were recorded. **RESULTS:** In the 4.5-year period, there were 7128 donors – both voluntary and replacement donors. The donors were in the age group 18 to 50 years. Out of the 116 donors tested positive for any test, there were 5 female donors and the 111 male donors. The donors who tested positive formed 1.6% of the total number of donors. The maximum number of donors were positive for HBsAg (n=47), followed by positivity for HCV (n=45). The seroprevalence of HBsAg, HCV, HIV and Syphilis was 0.66%, 0.63%, 0.25% and 0.1% respectively. There was no case with smear positive for malaria parasite. **CONCLUSION:** The seroprevalence of TTI is minimal in our set up. The risk can be kept to a minimum by proper donor selection and testing of the collected units.
KEYWORDS: HIV, Hepatitis B virus, Hepatitis C virus, Blood donors.

INTRODUCTION: Timely transfusion of blood saves many lives, but puts the people receiving transfusions at risk of acquiring transfusion transmissible diseases (TTIs) which is still a major concern in the practice of transfusion medicine. Blood transfusion carries the risk of transfusion-transmissible infections, including human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), syphilis (Treponema pallidum), malaria and infrequently toxoplasmosis, brucellosis and some viral infections like CMV, EBV and Herpes. With every unit of blood, there is 1% chance of transfusion-associated problems including transfusion-transmitted diseases.[1]Preventing the transmission of infectious diseases through blood transfusion in developing countries is difficult but can be improved by policies and strategies. These strategies have been extremely effective but transmission of diseases still occurs, primarily because of the inability of the test to detect the disease in the pre-seroconversion or 'window' phase of their infection, high cost of screening, immunologically variant viruses, and non-seroconverting chronic or immuno silent carriers.

The aim of the this study was to find out the prevalence of transfusion transmissible diseases (TTIs) in both voluntary and replacement donors in our hospital transfusion service setup and thus aid in evaluating the safety of the blood units ready for transfusion.

MATERIAL AND METHODS: The present study was conducted at the Blood Bank of our Medical College Hospital. This Blood Bank is located in suburban Mangalore in Karnataka state. Data was

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collected retrospectively for a 4.5-year period from January 2008 to June 2012. Donor data including demographic details and results of the screening tests were recorded. The donors were both Voluntary and Replacement donors. Professional donors are not permitted to donate in our Blood Bank. Donors were selected strictly by the standard criteria for donor fitness.

Tests are routinely done on every blood unit to exclude HIV, HBV, HCV, syphilis and malaria as per the regulations of the Drugs Control Authority in India. The testing was done by CLIA (Chemi Luminescence Immuno Assay)using kits manufactured by Ortho-Clinical Diagnostics for HIV (Anti-HIV 1+2), HBS Ag (HBsAg ES) &HCV (Anti HCV). Test for syphilis was done by RPR (Rapid Plasma Reagin – Nontreponemal macroagglutination method) manufactured by Agappe Diagnostics Ltd. And blood was screened for malaria parasites by peripheral blood smear. All the reactive samples were repeated in duplicate before labeling them seropositive. The donated blood was discarded whenever the pilot donor sample was found positive for any TTI.

RESULTS: In this 4.5-year period, there were 7128 donors –both voluntary and replacement donors. The donors were in the age group 18 to 50 years. The results of the serological testing are given in Table 1. Out of the 116 donors tested positive for any test, there were 5 female donors and the 111 male donors. The donors who tested positive formed 1.6% of the total number of donors. The maximum number of donors was positive for HBsAg followed by positivity for HCV. There was no case with smear positive for malaria parasite. The seroprevalence of HBsAg, HCV, HIV and Syphilis was 0.66%, 0.63%, 0.25% and 0.1% respectively.

	VOLUNTARY					REPLACEMENT					Total
TEST	**2008**	**2009**	**2010**	**2011**	**2012 (6m)**	**2008**	**2009**	**2010**	**2011**	**2012 (6m)**	
HIV	7*	3	2	3	0	2	0	0	1	0	18(15.5%)
HBsAg	10+	9	4	7	5	3	5	1	2	1	47 (40.5%)
HCV	13*+	8	7	5	1	4	3	2	2	0	45 (38.8%)
Syphilis	1	1	1	0	0	1	1	0	0	1	06(5.2%)
Malaria	0	0	0	0	0	0	0	0	0	0	0
Total	31	21	14	15	6	10	9	3	5	1	116

Table 1: Year-wise distribution of seropositive cases among donors

*one donor was both HIV & HCV positive+one donor was HBV &HCV Positive

DISCUSSION: Transfusion of blood and blood products is a life saving measure and helps innumerable people worldwide. At the same time however, blood transfusion is an important mode of transmission of infection to the recipients. The majority of known cases of transfusion transmitted diseases in India have been caused by HIV, HBV, HCV, Treponema pallidum and malarial parasites. Hence screening donors for these tests has been made mandatory in India.

Seroprevalence varies with different regions. In various studies done the seroprevalence was variable in different regions in India. In Northern India, a study from New Delhi showed a seroprevalence of HBsAg - 1.66%, HCV – 0.65%, HIV – 0.35% and Syphilis – 2.8%, [2]a study from Haryana showed a prevalence of HBsAg – 1.7%, HCV – 1%, HIV – 1% and Syphilis – 0.9%[3], a study

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from Ludhiana showed a prevalence of HBsAg –0.66%, HCV – 1.09%, HIV – 0.084% and Syphilis – 0.85%, [4]and a study from Lucknow showed a prevalence of HBsAg –1.96%, HCV – 0.85%, HIV – 0.23% and Syphilis –0.01%.[5] In our study the prevalence of HIV was mostly comparable to these studies but that of Hepatitis B & C, and syphilis was lower.

A study from Western India showed a prevalence of HBsAg –3.4%, HCV – 0.28%, HIV – 0.44% and Syphilis – 0.2%.[6] These figures were slightly higher when compared to our study except for the incidence of Hepatitis C. In Eastern India, a study from Kolkata showed a seroprevalence of HBsAg - 1.55%, HCV – 0.35%, and HIV – 0.32%.[7] The prevalence of HIV was comparable to these studies but that of Hepatitis B was lower and hepatitis C was higher.

In South India, a study from Andhra Pradesh showed a seroprevalence of HBsAg - 1.41%, HCV – 0.84%, HIV – 0.39% and syphilis 0.08%.[8]Studies from our state, Karnataka, also showed slight differences in seroprevalence of TTI. A study from Mysore in southern Karnataka showed a seroprevalence of HBsAg - 1.77%, HCV – 0.13%, HIV – 0.63% and syphilis 0.28%.[9] The figures from this study were slightly higher when compared to our study except for the incidence of Hepatitis C. A study from a Blood bank in the urban area of Mangalore showed a seroprevalence of HBsAg –0.34%, HCV – 0.06%, HIV – 0.06% and syphilis 0.11%.[10] This seroprevalence was much lower than that found in our study.

This retrospective study also observed a fall in the number of tranfusion transmitted infections over the five year study period. The seropositivity for HBsAg in the 5 years has decreased very minimally, where as that of HIV has reduced. It is estimated that the global prevalence of HCV infection is approximately 2%. The mean prevalence of HCV infection among blood donors at our center was 0.63%. Some authors have reported that a positive correlation exists between seroprevalence of Syphilis and HIV and that serologic screening for Syphilis serves as a surrogate marker for HIV.[4] The mean seroprevalence of Syphilis between 2008 and 2012 at our blood bank was 0.1%. There was no correlation between the seroprevalence of HIV and syphilis.

The low seropositivity among donors is mainly attributed to pre-donation counseling. The improved screening and testing of blood donors has significantly reduced transfusion-transmitted infections in most developed countries. This has not been so in all developing nations. Poor health education and lack of awareness result in blood transfusion being a potentially significant route of transmission, although risk may be reduced by the vigorous screening of donors. Moreover, it is important to remember that blood donations collected in the “window period” of the infection may be infectious despite a negative antibody test. Concealment of medical history by donors poses a great threat to the safety of blood supply. Efforts to ensure an adequate and safe blood supply should also include striving for optimal use of blood and its products. Blood should be transfused only it is absolutely essential to the care of the patient.

To reduce the risk of these TTIs, non-remunerated voluntary donor services need to be instituted. Extensive donor selection and screening procedures can improve the blood safety. Our study also found that the number of transfusion transmitted infection prevalence was significantly less in replacement donors (n=28) than the voluntary donors (n=88). An emphasis must also be laid on voluntary exclusion, which will require increased awareness and change in the attitude of people. Voluntary blood donation has to be made a part of healthy lifestyle, enlightening the public about the benefits of voluntary blood donations.

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CONCLUSION: The seroprevalence of TTI is relatively minimal in our set up. Transfusion of blood and blood products is a life-saving procedure. However, every blood transfusion has a potential risk of transmitting infections which are hazardous to the recipient. This risk can be greatly minimized by continuous improvement in donor selection practices and the quality of screening tests. Evaluation of data on the prevalence of these infections permits an assessment of their occurrence in the population and consequently, the safety of the donor.

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