

Seroprevalence Of Common Transfusion - Transmitted infections among Blood Donors

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Abstract:

The aim of this study is to present the status of transfusion –transmitted infections among the apparently healthy donors so as to increase the awareness of complications of blood transfusion and make the clinicians more vigilant with regard to judicious use of blood. A total of 5008 units of donor's blood was screened from January 2006 to December 2008 at blood bank of People's Hospital, Bhopal . The result of screening showed total seropositive samples for hepatitis B (2.9%), hepatitis C (0.57%), human immunodeficiency virus (HIV; 0.51%) and Venereal Disease Research Laboratory Test (VDRL; 0.23%) by using enzyme linked immunosorbent assay (ELISA) methods, and rapid plasma reagin (RPR) method for syphilis.

Key Words: Transfusion transmitted infection (TTI), Seroprevalence, Human immunodeficiency virus (HIV), hepatitis C virus.

Introduction:

Blood transfusion can be a life saving intervention . However, like all treatments it may result in acute or delayed complications and carries the risk of transfusion–transmissible infections including HIV, hepatitis B & C , syphilis and malaria etc. Appropriate clinical use of blood and supply of safe blood and blood products can minimize such complications and risks. It should, therefore, be obligatory on those who are involved in transfusion of blood to a patient that blood transfusion should not harm the patient. There are number of ways by which risk can be reduced and it includes improving donor selection and direct screening of blood for evidence of presence of infectious agents or markers produced by them. This study was undertaken to know the prevalence rate of infectious markers among blood donors.

Material and Methods:

A total of 5008 units of blood was collected from donors (voluntary & replacement) from January 2006 to December 2008 at Blood Bank of People's Hospital, People's College of Medical Sciences & Research Centre, Bhopal. Donors were selected by taking history , clinical examination and following strict donor's selection criteria to eliminate professional donors. All the samples were screened for hepatitis B surface antigen (HBs Ag), HIV(1and 2), hepatitis C

virus (HCV) by ELISA method using approved commercially available kits. Screening for VDRL was done by Rapid Plasma Reagin method. All the reactive samples were repeat tested before labeling them seropositive and respective blood units were discarded.

Result :

A total of 5008 blood donors were screened in last three years . The number of donations have increased from 1101 in 2006 to 1868 in 2007 and 2039 in year 2008. The results of seropositive samples for HBsAg, HCV, HIV and VDRL are shown in Table-1. A gradual increase in seropositive samples of HBsAg was observed in last three years, whereas decline was noticed for HCV, HIV, and VDRL.

Discussion:

Recent studies in the West have shown that the estimated risk of transfusion – transmitted HIV, HCV and to a lesser extend HBV via blood products is very low (Alvarez et al, 2002; Pomper et al, 2003). Primarily because of success in preventing HIV and other established transfusion –transmitted viruses from entering the blood supply. HBV is a major source of transfusion transmitted hepatitis and is associated with a carrier state and chronic liver disease. In the present study the incidence of HBsAg was 2.6 % in 2006, 2.67 % in 2007 and 3.43% in 2008 and overall incidence was 2.9%, in contracts, seropositivity of HBV in another Indian study was observed to be 1.55% in 1996, which came down to 0.99% in 2002 (Sharma et al, 2004). Seroprevalence of HBsAg in various other Indian studies has been shown to range between 1.86% to

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Table I: Showing results of seropositive donors blood samples for HBsAg, HCV, HIV, & VDRL.

	Year 2006	Year 2007	Year 2008	Total
Total units	1101	1868	2039	5008
HBsAg Positive	29 (2.6 %)	50 (2.67 %)	70 (3.43 %)	149 (2.9 %)
Anti HCV Positive	9 (0.81%)	11 (0.58%)	9 (0.44 %)	29 (0.57 %)
HIV Positive	9 (0.81 %)	6 (0.32 %)	11 (0.53 %)	26 (0.51 %)
VDRL Positive	0 (0.0 %)	9 (0.48 %)	3 (0.14 %)	12 (0.23%)

4% (Chandrasekaran et al, 2000; Srikrishna et al, 1999; Garg et al, 2001; Choudhari et al, 1995).

The prevalence of seropositivity for anti-HCV was found to decline, in present study, from 0.81% in year 2006 to 0.58 % in 2007 and 0.44 % in 2008 which was lesser as compared to HBsAg positivity.

HCV is transmitted primarily through blood exposure. In contrast to HBV, about 20 to 40% of HCV cases are acute and majority of them progress to chronic infection. The long term risk of developing cirrhosis and hepatocellular carcinoma is greater in HCV infected individuals than in those infected with HBV. Indian studies indicate that seroprevalence of HCV ranges between 0.4% to 1.09%. (Sharma et al, 2004; Chandrasekaran et al, 2000; Srikrishna et al, 1999 ; Gupta et al, 2004).

The incidence of HIV seropositivity was 0.81% in 2006, 0.32 % in 2007 and 0.53 % in the year 2008. The seropositivity of HIV has decreased in last three years from 0.81 % to 0.53 %. The HIV seroprevalence in Indian scenario has been reported between 0.2% to 1% (Sharma et al, 2004; Kaur & Basu, 2005).

The risk of acquiring HIV from a window period donor based on testing for HIV antibody has been reported to be 1 in 4,93,000 units transfused in the US. It has been estimated that HIV-NAT (nucleic acid amplification technique) has reduced the window period from 16 days to 10 days and thus the residual risk following NAT implementation has diminished to 1 in 9,86,000 units (Kaur & Basu, 2005; Schreiber et al, 1996). The VDRL reactivity has shown minimal number of positive samples as compared to other

Transfusion transmitted infection in the present study i.e. 0 % in 2006, 0.48 % in 2007 and 0.14 % in year 2008. In the present study incidence of HBsAg seropositivity was found to be the highest as compared to other transfusion –transmitted infections. Since the introduction of NAT in the screening procedure of blood donations, the estimated risk of HCV and HIV infections has decreased significantly . During the ‘window period’ of hepatitis B, detection of the IgM class of antibodies to the hepatitis B core antigen (Anti HBc – IgM) serves as a useful marker which indicates a recent infection. Therefore, it is strongly suggested that this marker must be utilized for screening of blood units to detect the hepatitis B during the window period. In this study the maximum and minimum prevalence rate of HIV was 0.81 % in 2006 and 0.32 % in 2007 respectively. Though the reactivity for VDRL is minimal in present study ranging from 0.0 % to 0.48 % but it is essential to exclude high risk donors. Transfusion transmitted syphilis is not a major hazard of modern blood transfusion therapy. Only rare cases of transfusion transmitted syphilis have been documented. The rapid plasma reagin test is commonly used for screening the blood products for syphilis. It is not the transmission of syphilis that is worrisome, being a sexually transmitted disease, it’s presence points towards donor’s indulgence in “high risk” behavior and consequent higher risk of exposure to infections like HIV and hepatitis (Ness, 1991). The increased risk of TTI of HBV, HCV and HIV could be minimized by introduction of few more tests for screening of donor’s

sample. Introduction of nucleic acid amplification testing (NAT) for HCV, HIV, anti-hepatitis B core antigen (HBcAg) and IgM for hepatitis B infection is recommended to detect the infections during window period.

To conclude, with the implementation of strict selection criteria of donor as per the guidelines laid down for blood banks in the gazette notification by the Government of India and use of sensitive laboratory screening tests, it is possible to decrease the incidence of seropositivity of transfusion-transmitted infections and improve the blood product safety.

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