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Original Article:

Blood Transfusions: Are They Life Saving or Transfusing Infections?

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Abstract: Introduction: There is a risk of 1 - 2 per 1000 recipients receiving contaminated blood with viral, bacterial and parasitic agents.TTI'S are the most commonly encountered complications in transfusion medicine. The objective of the study was to determine the seroprevalence of TTI's among blood donors, who represent healthy population at large. **Materials & methods:** A total of 33,658 blood units were received from voluntary and replacement donors over a period of 5 years. Surface antigen of HBV and antibodies to HIV and HCV were determined using ELISA. Syphilis was detected using TPHA test. **Results:** 947 (2.81%) blood units tested positive for HBV, HCV, HIV and / or syphilis. Overall prevalence was HBV – 1.77%, HCV – 0.13%, HIV – 0.63% and Syphilis – 0.28%. Nine (0.03%) donors had coinfections. **Conclusion:** The screening of blood donors is the corner stone in assuring the safety of blood transfusion.

Key Words: Transfusion Transmitted Infections; HBV; HCV; HIV; Syphilis

Introduction:

Transfusion of blood and blood components as a specialised modality of patient management saves millions of lives worldwide.[1] Getting safe blood is becoming increasingly difficult because of blood borne infections like Hepatitis B virus (HBV), Hepatitis C virus (HCV), Human immunodeficiency virus (HIV) & *Treponema palladium*. There is a risk of 1–2 per 1000 recipients receiving contaminated blood with viral, bacterial or parasitic agents.[2] According to WHO estimate the lack of effective screening of blood donors' results in up to 16 million new infections with HBV, 5 million new infections with HCV, 1, 60,000 new cases of HIV infections every year.[3]

HIV, HBV & HCV are known to cause coinfections due to common route of transmission .The viruses are partners in crime augmenting the pathogenesis & there by increasing the morbidity & mortality.

Evaluation of data for the prevalence of transfusion transmitted infections (TTI's) permits an assessment of acquisition of these infections in the blood donor population & consequently the safety of the collected blood donations. It also gives an idea of epidemiology of these infections in the community.[4]

Materials and Methods:

A total of 33,658 units of blood were collected from both voluntary and replacement donors over a period of 5 years (Jan 2006 – Dec 2010) at blood bank attached to Mysore Medical College & Research Institute, Mysore, Karnataka, India. Samples were screened for HBV, HCV, HIV & Syphilis.

HBV screening was done using ERBALISA kit to detect HBsAg using polyclonal antibodies against surface antigen of Hepatitis B virus. ERBALISA kit was used to detect HCV antibodies using a mixture of synthetic peptides & recombinant proteins of HCV that is CORE NS_3, NS_4 & NS_5. ERBALISA kit HIV 1 / HIV 2 a solid phase immunoassay utilising a mixture of synthetic peptides for detection of HIV1 & HIV2 antibodies was used to detect HIV. Validity of ELISA tests was assessed by means of acceptance criteria laid down by the manufacturer. A rapid TPHA test for the diagnosis of syphilis to detect IgG & IgM antibodies to *Treponema palladium* was used. Seropositive blood units were discarded. Infected donors were referred for specialist care.[5]

Results:

A total of 33,658 blood samples were included in the study during the period Jan 2006 – Dec 2010. 947 (2.81%) blood units showed seropositivity for TTI's.

Table: Seroprevalence of various Transfusion Transmitted Infections

Year	Total donors	HBV	HCV	HIV	Syphilis
2006	08487	111(1.31%)	0	047(0.55%)	08(0.09%)
2007	06569	091(1.38%)	02(0.03%)	049(0.74%)	25(0.38%)
2008	06404	166(2.59%)	14(0.22%)	044(0.69%)	30(0.47%)
2009	06257	087(1.39%)	10(0.16%)	040(0.64%)	11(0.18%)
2010	05941	127(2.14%)	19(0.32%)	032(0.54%)	20(0.34%)
Total	**33,658**	**596(1.77%)**	**45(0.13%)**	**212(0.63%)**	**94(0.28%)**

Nine donors had coinfections of which six were coinfected with HIV & HBV, two of them were infected with HIV & HCV & one donor with HBV & HCV.

Discussion:

In recent years there has been a special interest in donor selection strategies in blood banks in order to provide safer blood supply. There is no screening method to reduce the risk of TTI's to zero. It appears that it is essential to adopt strict criter-

ia in the selection of donors and to avoid unnecessary transfusions.[4] Serosurveys are one of the primary methods to determine the prevalence of TTI's. In our retrospective study, we have evaluated the seroprevalence of HBsAg, anti-HCV, anti-HIV and syphilitic antibodies among blood donors who are considered to be of low risk behaviour group as there is no data available from this region.

Over a period of five years the prevalence of HBsAg was 1.77% (range 1.31% - 2.59%). A study in Orrisa has reported 1.13% and another study in Delhi has reported 2.23% of HBV infection in blood donors respectively.[6,7] A low prevalence of HBV of 0.62% was reported in a study at costal Karnataka.[8] In our study a significant rise in HBV prevalence has been noted in the year 2010 i.e. 2.59%.

HCV seropositivity in our study was 0.13% (0.03% - 0.32%). In India the prevalence of HCV in blood donors has been reported to be 0.12% to 2.5%. A study in Delhi has reported HCV in blood donors as 0.66% to 2.5% and in Western India 0.28% respectively.[7,9] There is significant increase in HCV seropositivity rate in the present study from 0.03% to 0.32% over a period of 5years. A study in Eastern India also has reported an increase in HCV seropositivity among blood donors.[10] High prevalence of 6% HCV infection was reported by another study in Hyderabad, South India.[11]

HIV antibodies were detected in 0.63% (0.53% - 0.74%) in our study. Other authors have reported HIV seropositivity of 0.4% and 0.55% among blood donors.[12,13] Syphilitic antibodies were detected in 0.28% (0.09% - 0.49%) in our study. Similar prevalence has been reported by other authors.[13,10] Data on the prevalence of >2 TTIs is limited.[14] In our study 9 donors (0.03%) had co-infections of which six donors had HIV & HBV (2.83% of HIV positive donors), 2 donors (0.91% of HIV positive donors) had HCV co-infection. One donor was positive for both HBV and HCV.

Studies on the prevalence of hepatitis viruses in patients with HIV have reported HIV and HBV/HCV co-infection rate as 12%–15%. However in India studies, this varies with the geographical region ranging from 9%–30% for HBV & 2%–8% for HCV. A study in North India has reported coinfections in blood donors as 0.05% of which 5 donors had HIV & HBV, 2 donors had HIV & HCV and another 2 donors had HBV & HCV coinfections.[14]

The absence of HBsAg in blood donors may not be sufficient to ensure the lack of circulating HBV and hence there are chances of missing occult HBV infection.[8] A study in central India has shown a positivity of 2.2% for HBV DNA in donors who tested negative for HBsAg by ELISA.[15] Majority of the problems are due to prevalence of asymptomatic carriers in the society, as well as, blood donations during the window period of infections. Most government hospital blood banks in India use ELISA test kits, which cannot detect HIV before 22 days, HBV before 59 days and HCV before 82 days of infection.[16] Considering the vast population of the country, even low prevalence amounts to the large number of infected people.[16] With this prevalence of TTI's, pit falls in detection methods and the morbidity and mortality associated with TTI's, we have to urgently consider the need to modulate and adopt newer sensitive technologies. Stringent measures need to be taken for blood donor screening, by using more sensitive methods to detect infections early, like Nucleic acid amplification technology (NAT) assays.[17]

Conclusion:

Considering the various risks in transfusions, we have to adopt judicious blood transfusions and sensitive technologies for screening of blood donors in order to safeguard recipients of blood and its components.

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