

Seropositivity of Hepatitis C, Hepatitis B and HIV in Chronically Transfused β -Thalassaemia Major Patients

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ABSTRACT

The purpose of this study was to determine the frequency and trend of transfusion transmitted infections (TTI) in chronically transfused β -thalassaemia major (TM) patients with reference to the duration of transfusions. A cross-sectional study was done on 160 β -TM patients and 5517 healthy blood donors to find out the prevalence of HCV, HBV and HIV infections. Out of 160 patients, 21 cases (13.1%) were anti-HCV positive, 2 (1.25%) were HBsAg positive. HIV antibodies were not detected in any sample. However, 109 (1.9%) and 104 (1.8%) of 5517 blood donors were positive for HCV and HBV respectively. No donor showed HIV antibodies. Anti-HCV was positive in 9/111 (8.4%) thalassaemics (< 10 years of age) while 11/49 (22%) [$>$ 10 years of age] showing significant difference ($p = 0.005$) among the two groups. For the past 10 - 12 years the screening of blood has reduced the magnitude of the disease significantly as shown by the trend in two age groups. Further improvements need to be done to implement uniform screening throughout the country.

Key words: *Beta thalassaemia. Pakistan. Hepatitis B. Hepatitis C. Transfusion transmitted infections.*

Thalassaemia is prevalent in Pakistan, which is an inherited autosomal recessive blood disorder.¹ Its management depends on regular blood transfusions; which in turn pose the threat of TTIs. Among many infections, hepatitis B, C and HIV are the most commonly reported TTIs in these patients. The declining trend of hepatitis B has rendered *hepatitis C virus* infection the most common post-transfusion infection and important cause of end-stage liver disease in many countries. These infections and iron overload have been the downside of regular blood transfusions in TM patients despite the overall improvement in survival. Studies in Pakistan showed seroprevalence of HBsAg (7.8% weighted average, range 5.0 - 8.4%) and HCVAb (47.2% weighted average, range 25 - 60%) in multi-transfused population of patients with thalassaemia or haemophilia.^{2,3} A regional study suggested that the prevalence of TTIs is more in children over age 20 years indicating improvement in blood screening practices during the last decade.⁴ Repeatedly transfused patients continue to get exposed to infectious blood products from donors in window period or with low levels of viraemia. There are very few recent local studies on the problem, so this study provides recent data to evaluate the trend on the prevalence of three common TTIs in β -thalassaemia patients and healthy donor populations.

This cross-sectional study was performed after approval of the institutional review board and was carried out on

patients and healthy blood donors attending the Thalassaemia Clinic and Daycare of National Institute of Blood Diseases (NIBD), Karachi. The duration of the study was from January 2010 to December 2010. After informed consent, 160 β -TM patients and 5517 healthy blood donors were enrolled. Demographic data including age, gender, donation, number of blood transfusions and previous medical history were obtained from patient's medical record and interviews. Healthy blood donors were involved as per donor selection criteria of American Association of Blood Banks (AABB) guideline.

A blood sample of 5 cc was collected and tested for HBsAg (Bio kit, Spain), anti-HCV, anti-HIV assays with ELISA kit (General Biological Cooperation, Taiwan) by using Biotech Elx 808 ELISA strip reader as per manufacturer's instructions. The samples were run in batch of 20 every time with substrate blank, positive and negative control to validate the assay. The samples were considered reactive when the sample absorbance/cut off (SA/C) ratio was $>$ 1.0 (cut off value) and Non-reactive when the sample absorbance / cut off (SA/C) ratio was $<$ 1.0, (cut off value) for HBsAg, anti-HCV and HIV respectively.

Prevalence of HCV in thalassaemic patients was calculated in two strata of patients; $<$ 10 years of age and $>$ 10 years of age to look for any change in trend. Data was analyzed using Statistical Package for Social Sciences (SPSS) software version 17.0. The differences were considered significant where $p <$ 0.05.

There were 81 males (51%) and 79 females (49%) out of 160 patients; mean age was 8.5 ± 6.42 years (range 6 months - 24 years). Twenty one patients (13.1%) were anti-HCV positive; mean age ($n = 21$) was 8.9 ± 4.21 years whereas that of negative patients ($n = 139$) was 7.8 ± 4.3 years. No statistically significant difference was

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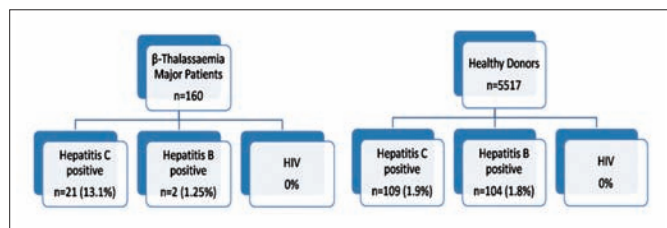


Figure 1: Screening results for transfusion transmitted infections in thalassaemia patients and healthy blood donors.

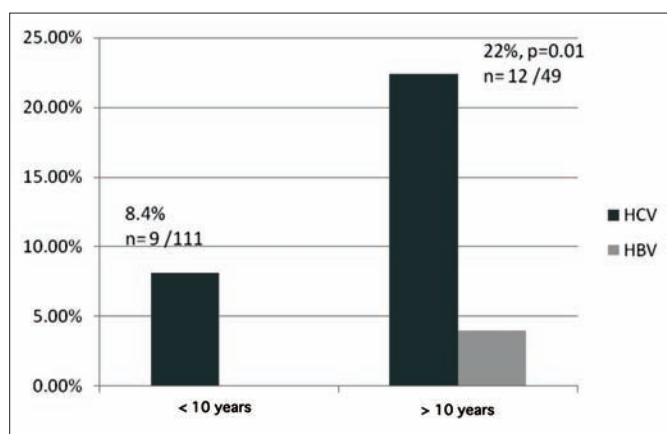


Figure 2: Comparison of reactive HBV and HCV between age groups in thalassaemic patients.

observed among anti-HCV seropositivity of male and female patients ($p = 0.27$, $t = 1.09$). HBsAg was positive in 2/160 patients (1.25%). HIV anti-bodies were not detected in any sample (Figure 1).

On the other hand 109 (1.9%) and 104 (1.8%) of 5517 blood donors were positive for HCV and HBV respectively. No donor showed HIV anti-bodies. When point prevalence was calculated in two age groups of the patients, only 9 out of 111 thalassaemics (8.4%) were under the age of 10 years who were anti-HCV positive while 12/49 patients (22%) older than 10 years of age were anti-HCV positive showing significant difference among the two groups ($p = 0.01$) [Figure 2].

Regular blood transfusion remains the life line for such patients, in combination with iron chelation therapy. This study showed that the prevalence of HbsAg as 1.25% in thalassaemics, while 1.8% in healthy donors which is very close to the prevalence of hepatitis B in general population,⁵ whereas, the frequency of anti-HCV positivity was found in 13.1% of the thalassaemic patients as compared to 1.9% healthy blood donors. In comparison, data from a government setup in Karachi showed frequency of HCV infection in multi-transfused beta thalassaemic patients to be 43%,⁶ pointing towards major need for improvement in the public sector. The countries with higher HCV prevalence in general population had a higher prevalence rate among thalassaemic patients too, hence raising the predictive value for the infection. In Pakistan, anti-HCV screening started in 1994 in few centres but was soon imple-

mented all over the country.⁷ This study showed that prevalence of anti-HCVAB is significantly lower in those thalassaemic patients who started getting blood transfusions after year 2000 (> 10 years old) [Figure 2]. Though in many centres, proper screening protocols are still not followed resulting in high TTIs frequency.⁶ This points towards the need of more effective actions to be taken to make blood transfusions safer. Proper screening and appropriate donor selection criteria must be ensured.

Shah *et al.*⁸ reported that the frequency of HCV infection was more than double in patients who had 50 or more blood transfusions compared to thalassaemics with less than 50 transfusions. Since the prevalence rate of seropositivity increases with the number of transfusions, these results may be a reflection of incorporation of HCV screening of blood donors and lesser exposure to blood products in younger patients. Although the lower prevalence of HCV in these patients (< 10 years old) shows good outcome of introduction of screening procedures in the country, this positive trend must further be improved by effectively implementing the guidelines for donor selection. Hepatitis C remains the most threatening TTI in terms of magnitude in this part of the world showing similar trend as the rest of the world. For the past 10 - 12 years the screening of blood has reduced the magnitude of the disease significantly as shown by the trend in two age groups. Further improvement needs to be done to implement uniform and effective screening of donor blood throughout the country to further lower the threat of such infections.

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