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Epidemiology of Hepatitis B, Hepatitis C, And Human Immunodeficiency Virus Infections in Multitransfusedthalassemic Patientsin West Bengal.

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Abstract
Aims and Objectives: *To know the prevalence of HBV, HCV, and HIV infection in multitransfusedthalassemic children &Correlation between these infections & liver function status.**Setting&Design**: Cross-sectional Observational Study, Inpatient pediatric ward in a tertiary care hospital Medical College, Kolkata. **Subjects and methods**: 100 patients with β-thalassemia major were enrolled and their sera were tested for HBsAg, anti-HCV antibodies & anti-HIV antibodies along with liver function test.**Results**: Twenty five (25%) & fifteen (15%) were positive for HCVAb&HIVAb respectively, seven(7%) were positive for both HCVAb&HIVAb and three(3%) were positive for all three viral markers. Liver functionwas abnormal in patients with HCV and HIV infection with P < 0.001 & P < 0.05 respectively.**Conclusion**: HCV & HIV are major transfusion associated infections. There is a need for better pretransfusion screening of blood, vaccination against HBV and the treatment of viral infections, if coexisting to prevent progression to chronic liver disease.*
Key Words: *Beta thalassemia major, Hepatitis B Virus, Hepatitis C Virus, Human Immune Deficiency Virus.*

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I. Introduction

Regular blood transfusion in patients with hereditary hemolytic anemia, particularly thalassemia, has improved their overall survival, but carries a definite risk of acquisition of blood-borne virus infections, especially viral hepatitis. Nowadays, vaccination against hepatitis B has efficiently been able to restrict the transmission of hepatitis B virus (HBV) infection. However, post-transfusion transmission of hepatitis C virus (HCV) has still remained a major health concern in thalassemic patients. In addition, since marked liver iron overload, which is often inevitable in patients on regular blood transfusion, and HCV infection have been shown to have a potentiating effect on hepatic fibro genesis in thalassemic patients.[1] Chronic hepatitis C has been indicated as a progressive disease that dramatically increases the morbidity and mortality rates among these patients due to liver failure or hepatocellular carcinoma.[2]

The prevalence of HCV infection among thalassemic patients has been reported to be up to 60% in Italy,[3] although the compulsory screening of donated bloods has decreased the incidence of both post transfusion HBV and HCV infections.[4]

A study in Thailand showed that the patients with anti-HCV antibodies had significantly abnormal liver function test. However, there were also significant correlations between iron status as indicated by transferrin saturation or serum ferritin levels and SGOT, SGPT, and 3-glutamyltransferase (GGT) levels.[5]

We conducted this study to provide a comprehensive data bank on the epidemiology of HBV, HCV, and human immunodeficiency virus (HIV) infections in patients with β-thalassemia in eastern India&the relationships of the infection to blood transfusion and the infection’s effects on liver function have also been determined. Furthermore, we tried tostrengthen the Pediatric HIV clinic in Medical College, Kolkata.

II. Materials and Methods

Study type &design: Cross-sectional Observational Study.
Study Area: Inpatient pediatric ward in a tertiary care hospital Medical College, Kolkata.
Study period: June 2007 to May 2008.
Sample Size: One hundred patients of Beta-thalassemia major up to 12 years of age.

Study subjects: Total 129 patients were admitted during study period and 29 were excluded as they had history of less than 10 blood transfusions thus, our study sample comprising of 100 patients who had history of more then 10 blood transfusions.

Statistical analysis: Collected data analyzed using SPSS software and expressed as mean +/- SE and Comparison of variables done by
Student- t- test.

III. Methodology

One hundredpatients with β-thalassemia major from eight districts of West Bengal including Kolkata(n=15), Hoogly(n=17), Howrah(n=23), 24Parganas-N(n=10), 24Parganas-S(n=10), Paschim Midnipur(n=15), PurbaMedinipur(n=7), Purulia(n=3) admitted in our in-patient pediatric ward, Medical College & Hospital(MCH), Kolkata for blood transfusionwere enrolled in this study between June 2007 to May 2008. All enrolled patients had history of more than 10 blood transfusions. Initial data including transfusion history and previous medical history were obtained by reviewing medical records and interviews. Thereafter, venous blood samples were obtained from each patient before blood transfusion. Blood samples for HIV were tested at VCTC located at blood bank, MCH, serology for HBV & HCV were done at Department of Virology, School of Tropical Medicine, Kolkata. A third sample was tested for Liver Function Test(LFT) at Department of Biochemistry, MCH, Kolkata.

The study protocol was approved by our institutional review board and informed written consent was taken from parents of each patient involved.

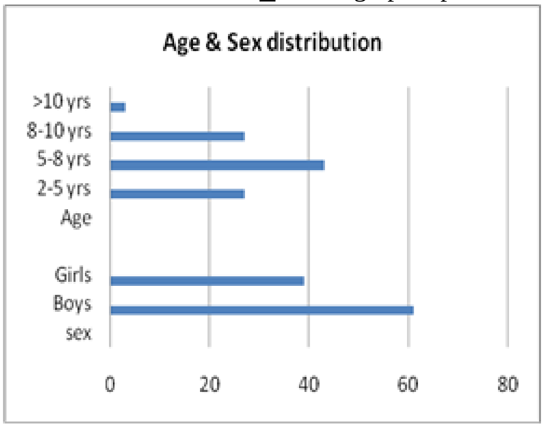
Results are expressed as mean ± standard deviation (SD). Comparison between two groups was made using the Student's t test for continuous variables. A P value < 0.05 was considered statistically significant. All statistical analyses were performed using SPSS software for Windows (version 10.0; SPSS Inc. Chicago, IL, USA).

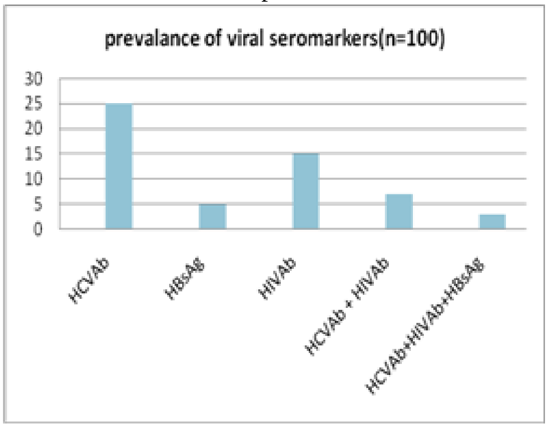
IV. Results and Analysis

Of thetotal 100 multitransfused children included in the study, 61 were boys and 39 were girls. Maximum children were in the age group ranging from 5 to 8 years(43). In the toddler group (1- 3 years) and the adolescent age group (above 10years) the number of subjects were few. Most of the subjects were from the Howrah district(23) followed byfrom Hooghly(17), Kolkata(15), PaschimMedinipur(15), South & North 24 Parganas(10). Maximum cases of seropositivity were found among the patients of Howrah district-15(65.21%) followed by Kolkata10(66.66%), PaschimMedinipur 9(60%) and Hoogly respectively8(47.05%). Least number of cases were reported from the Purulia district1(33.33%). Of the total 100 cases, 15% cases were positive for HIV, 25% cases were positive for HCV and 5% cases for HBV. 7% cases were positive for both HIV and HCV and 3% cases were positive for HIV, HCV and HBV. Maximum number of children have been receiving transfusion from 6 to 8 years (28 children) and the maximum prevalence of infection (20 children)were also noted in this group. Only 10 children have been receiving transfusion for less than 2 years and of them only 1 case of seropositivity was noted. There is an increasing tendency of infection till 6 to 8 years duration of transfusion. Paradoxically there is a fall in transfusion rate when the duration of transfusion exceeded 8 years.

There was no significant relationship between the presence of anti-HCV antibodies and the number and frequency of blood transfusions. Patients with anti-HCV antibodies, anti-HIV antibodies had significantly abnormal liver functions, such as higher levels of serum aspartate aminotransferase (SGOT) and alanine aminotransferase (SGPT) with $P< 0.001$ &$P< 0.005$ respectively, whereas correlation between LFT and HBsAg positive patients were not significant i.e; LFT of those patients were normal.

**Table: **1Demographic pattern and viral seromarkers of the patients.





Residence	**Patients No.**	**Seropositive**
Kolkata	15	10(66.66%)
Hoogly	17	8(47.05%)
Howrah	23	15(65.21%)
24 Parganas(S)	10	5(50%)
24 Parganas(N)	10	3(30%)
PaschimMedinipur	15	9(60%)
PurbaMedinipur	7	4(57.17%)
Puruliya	3	1(33.33%)
	100	55

TABLE: 2 Correlation between LFT and HIV & HCV seropositive patients.

	SGOT			SGPT		
INFE-CTIONS	Reactive	Non-Reactive	P value	Reactive	Non-Reactive	P value
HIV	X1=111 S1=67.50 N1=25	X2=77 S2=37.48 N2=45	<0.05	X1=89.77 S1=61.58 N1=25	X2=64.03 S2=30.42 N2=45	<0.05
HCV	X1=120.07 S1=36.93 N1=35	X2=67.23 S2=42.25 N2=45	<0.001	X1=99.61 S1=31.11 N1=35	X2=55.15 S2=36.33 N2=45	<0.001

P =< 0.05 is statistically significant.

V. Discussion and Conclusion

We carried out this study on children withβ-thalassemia major from various districts of West Bengal to provide a comprehensive epidemiologic data on HBV, HCV, and HIV infections among thalassemic population of eastern India. In this study, we revealed that 35 % of β-thalassemia major patients were HCV infected, which is very much higher than the prevalence among general population in Eastern India (1.85%).[6]

Similarly, a high prevalence of HIV infection was noted (25%), which is pretty higher than the prevalence in thalassemic patients in India (8.9%) was reported previously.[7]

Five percent of our patients were HBsAgpositive, which is little higher than the value reported from the general population (2.97%) of Eastern India.[8]

High seroprevalence of these infections may be due to lack of anti-HCV screening of blood products in the blood banks in Government and private sector, proper screening in the blood banks using Third and Fourth generation ELISA test is not done correctly or may be the kits labelled as ELISA are at fault. Professional donors are also on the increase than voluntary donors.

Patients with anti-HCV antibodies and anti-HIV antibodies had significantly abnormal liver functions and there were also significant correlations between iron status as indicated by serum ferritin levels and SGOT, SGPT levels. The findings suggest that HCV, HIV and iron overload are the main causes of abnormal liver function in these patients with thalassemia..

HCV & HIV infections are major transfusion associated problems in multitransfusedthalassemics. For that, there is a need for better pretransfusion screening of blood, vaccination against HBV in such children and the treatment of both problems (iron overload & viral hepatitis), if coexisting in patients with thalassemia, is required to prevent progression to chronic liver disease.

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