

Prevalence of HIV, Hepatitis B and Hepatitis C infection in Thalassemia major patients in tertiary care hospital, Gujarat.

Hardik Bhavsar*, Kanu Patel**, Mahendra Vegad***, Molly Madan****, Anita Pandey*****,
Ashish Asthana#, Kalpesh Mistry#.

*Assistant Professor, Microbiology Department, Subharti Medical College, Meerut, U.P., **Associate Professor, Microbiology Department, B.J. Medical College, Ahmadabad, Gujarat, *** Department Head, Microbiology Department, B.J. Medical College, Ahmadabad, Gujarat, **** Department Head, Microbiology Department, Subharti Medical College, Meerut, U.P., *****⁵ Professor, Microbiology Department, Subharti Medical College, Meerut, U.P. # Tutor, Microbiology Department, B.J. Medical College, Ahmadabad, Gujarat

Abstracts: Background: Children suffering from beta thalassemia major, due to various genetic defects, have deficient synthesis of β globin chain of Hemoglobin. This leads to severe anemia, general fatigue and debility asking for repeated or frequent blood transfusion. On the other hand repeated blood transfusions such expose them to dangerous infections such as HIV, HBV and HCV. Aim: The aim of this study was to determine the prevalence of HIV, HBV and HCV infection among thalassemia major patients in an apex tertiary care hospital of Gujarat in west India. Materials and methods: Data were obtained from 100 β thalassemia major patients attending thalassemia clinic for blood transfusion at regular interval in an apex tertiary care hospital of Gujarat between April 2008 and September 2008. Their laboratory results were subsequently analyzed. Results: Out of 100 patients 65 and 35 were male and female respectively. 18 (18%) patients were found Anti HCV Ab positive, 6 (6%) were found HBsAg positive and 9(9%) patients were Anti HIV 1 and or 2 Ab positive. Older age, more number of transfusions were associated with increased chances of the test to come positive suggestive of infection with respective virus. Completion of vaccination against HBV, completely or partially, was associated with less chances getting infection with HBV Conclusion: The prevalence of HCV infection is much higher compared to HBV and HIV infection due to possibly infected blood transfusion among thalassemia major patients. Screening of Anti HCV Ab detection with highly sensitive and specific test for donated blood is mandatory. Techniques like P24 Antigen detection or RT-PCR should be introduced to shorten the window period for detection of HIV infected donated blood. [Bhavsar et al. NJIRM 2011; 2(3) : 47-50]

Key Words: HIV, Hepatitis B, Hepatitis C, Thalassemia

Author for correspondence: Dr. Hardik Kamlesh Bhavsar, R-29, Subharti University, Subhartipuram, Delhi Haridwar By pass, N.H. 58, Meerut, U.P. E-mail: bhavsar.dr.hardik@gmail.com

Introduction: β thalassemia major is a hereditary hemolytic anemia, requiring lifelong blood transfusions for the affected patients. It is a transfusion dependent severe anemia and is never free from hazards of repeated blood transfusions. It is also a major problem in Gujarat. (overall prevalence is 7.48%), specially in communities like Sindhi, Muslim, Lohana etc^{1,2}. The general incidence of thalassemia trait in India varies between 3 and 17%^{3,4,5}. It is estimated that there are about 65,000-67,000 beta-thalassemia patients in India with around 9,000-10,000 cases being added every year⁶. Among blood transfusion hazards, blood born virus infections are very important. These include HIV(risk of progression to AIDS which is untreatable), Hepatitis B virus and Hepatitis C virus which may lead to chronic

hepatitis, liver cirrhosis and hepatocellular carcinoma.

HCV is responsible for 80 to 90 % of post transfusion hepatitis in patients who received blood transfusion prior to introduction of routine blood products screening in 1990⁵. The prevalence of HCV infection among thalassemia patients has been reported to be upto 60% in Italy⁷. Lack of data regarding this prevalence prompted us to conduct this study to provide comprehensive data bank on epidemiology of HIV, HBV and HCV infection in patients with β thalassemia in Gujarat.

Material and Methods: This cross sectional study was performed between April 2008 and September 2008 at Civil Hospital, Asarwa, Ahmedabad, the biggest tertiary care hospital in Gujarat, West India.

Thalassemia major patients are enrolled in Thalassemia Clinic in Paediatrics Department. These patients come and visit the hospital on Thursdays for blood transfusions and other routine check ups.

100 such patients were enrolled in the study after obtaining due permission from IRB and consent from the guardians or parents of the patients. The parents or guardians of the patients were explained about the motive of performing the study and all about the method and processing of the sample obtained from them. Venous whole blood was collected in the plain vacutainer .

Demographic data such as age, duration and number of blood transfusions , history of HBV vaccination were obtained from detailed interviewing of the patient and/or guardians.

From collected whole blood, serum was separated on the same day and then separated serum was stored at -70° C. All sera were screened for Anti-HIV 1/2 Abs using third generation ELISA (ENZAIDS). Positive samples were confirmed by HIV 1and 2 Bispot test (IMMUNOCOMB) and rapid visual band test (SD-BIO) . Sera were also screened for HBsAg using Advanced HBsAg Test with third generation ELISA and Anti HCV Abs using (MICROLISA) , third generation ELISA.

Result: One hundred thalassemia major patients were tested. There were 65 (65.0%) males and 35 (35.0%) females; their mean age (\pm SD) was 6.84 ± 3.78 years (range 0.7to 15 years). The mean age (\pm SD) was 7.40 ± 3.79 for males and 5.89 ± 3.56 for females. The mean(\pm SD) number of blood transfusion was 66.44 ± 53.72 . Nine of the 100 patients were anti-HIV 1/2 positive by ELISA corresponding to a 09.0%. The mean age of the nine anti-HIV 1/2 positive patients was higher than that of negative patients (10.00 ± 3.16 vs. 6.49 ± 3.71 , $p<0.001$). Eighteen of the 100 patients were anti-HCV Antibody positive by ELISA corresponding to a 18.0%. The mean age of the eighteen anti-HCV Ab positive patients was higher than that of negative patients (08.73 ± 4.14 vs. 6.43 ± 3.59 , $p<0.001$). The mean number of blood transfusions of patients having Anti HCV Ab positivity was 111.5 ± 68.8 which was way higher

than that of patients having Anti HCV Ab negative results. (56.5 ± 44.5). Same way it was significantly high for patients tested Anti HIV Ab positive compared to negative. (112.22 ± 68.15 vs. 61.48 ± 50.43). Five out of six HBsAg positive children did were not vaccinated against Hepatitis B virus infection. (83.3%)

Table:1

Factor	No. of patients	Anti HIV 1or 2 antibody positive	HBsAg positive	Anti HCV positive
SEX				
Male	65	07	04	11
Female	35	02	02	07
AGE GROUP				
0-2	16	00	01	01
2-5	22	01	01	03
5-8	27	02	00	03
8-11	28	03	03	06
11-17	07	03	01	05

Table:2

No. of blood transfusions	No. of patients	Anti HIV 1 or 2 antibody positive	HBsAg positive	Anti HCV positive
0-50	51	03	02	05
51-100	34	03	03	04
101-150	07	00	01	03
151-200	08	03	00	06
More than 200	00	00	00	00

Discussion: TTIS (Transfusion transmitted infection) have always been a major problem in multi transfused patients in the past. As the magnitude of problem was always a topic for various studies, with advent of improved technology and universal screening of blood, the risk is decreased but surely present. HIV transmission through donated blood has become very rare after testing became mandatory for HIV-1 on 1989 and HIV-2 1993.⁸

In present study all nine patients found HIV reactive received more than 50 transfusions. Other modes of HIV transmission were screened and found not feasible. They were transfused HIV not

reactive blood from this hospital so they are likely to be infected by blood, donated by a donor who might be in window period of HIV infection. Despite of using 3rd generation ELISA, for screening of donated blood. This indicates that newer technique like P₂₄ Ag detection or reverse transcriptase PCR should be used to decrease the window period of HIV detection from donated blood.

Testing for HB_sAg, Anti- HCV and Syphilis also serves as “ surrogate markers” of high risk donors whose chance of being in window period is more.

The study by M.Ac Sheyyab di et al⁹ in Jordan measured HB_sAg positively and anti HB_sAg titre in thalassemia which were found 3.5% and 80% respectively similar results were found in a study by Shaharam et al in Iran being 1.5% and 55.2% respectively indicating good antibody titre after vaccination decreases incidence of HB_sAg. In present study also out of 6 children who were found HB_sAg positive, were nonvaccinated.

80% of total enrolled children were either vaccinated or on vaccination. Then low incidence of HB_sAg positivity can be correlated with good antibody titer after vaccination. Ideally minimum two doses of vaccination should be given before starting transfusion in a newly diagnosed thalassemia.

Hepatitis C is emerging as the predominant transfusion transmitted infection nowadays. There is no vaccination for HCV. Wonke B et al¹⁰(11.1%) in Delhi, Chaudhary N et al¹¹ (19%) in India, Shah SMA et al¹² in Pakistan (56.8%) Shahram M et al in Iran 19.6%) have found the prevalence of anti HCV Ab to be a high. In present study also it is 18% which way higher than other two TTIS.

Relationship between Age and Number of Blood transfusions: The figure shows that with increase in age, the cumulative number of blood transfusion received will increase.

Relationship between positivity and Age: Incidence of Anti HIV seropositivity shows that 6 out of 9 (66.0%) positives were more than 8 years old. 4 out of 6 (66.0 %) HBsAg positive children

and 11 out of 18 (61.11 %) Anti HCV Ab positive children were having age more than 8 years.

Relationship between positivity and number of blood transfusions: 6 out of 9 (66.0 %) Anti HIV 1/2 positive , 4 out of 6 HBsAg positive(66.6%) and 13 out of 18 Anti HCV Ab positive children (72.22%) were transfused more than 50 units of blood.

In India mandatory screening for HCV was introduced in 2002. It, therefore follows that children born in 2002 or later should not be ideally HCV positive. However out of 18 children who were found HCV positive, 4 children are below 6 years of age

Conclusion: The present study critically evaluated prevalence of three major transfusion-associated infections, namely infections by HIV, HCV, and HBV in thalassemia major patients enrolled at Civil Hospital, Ahmedabad, Gujarat in Western India.

Incidence of HIV positivity has decreased due to mandatory screening of all blood bags but the window periods can be further decreased by using improved technology like P24 Antigen detection or HIV viral RNA detection by RT-PCR. Donor awareness program and providing a good questioner before transfusion can lead to self exclusion of high risk donors.

Ideally all patients of thalassemia major should complete vaccination for Hepatitis B before starting transfusion or as soon as possible. Increased titre of Anti HBS antibody is protective against Hepatitis B viral infection.

The prevalence of HCV is still very high among frequent blood recipients like thalassemia major patients. This may be attributed to late starting of screening for HCV antibody in donated blood bags compared to that of anti HIV-1/2. Another fact which maybe responsible for high prevalence of HCV as compared to HBV is that no vaccine is available so far for protection against HCV.

References:

1. Patel J, Patel A, Patel J, Kaur A, Patel V. Prevalence of haemoglobinopathies in Gujarat,

- India: A cross-sectional study. *Int J Hematol.* 2009;5:1.
2. Parikh SB, Parikh BJ, Shah CK, Shah NR. Analytical profile of seroprevalence of HIV, Hepatitis B and Hepatitis C amongst voluntary and replacement blood donors-a 6 years study. *Gujarat MJ.* 2006;1:29–33.
 3. Balgir RS. The burden of hemoglobinopathies in India and the challenges ahead. *Curr Sci.* 2000;79:1536–47.
 4. Agrawal MB, Malkan GH, Bhave AA, Vishwanathan C, Billa V, Dube SR, et al. Antibody to Hepatitis C virus in multi-transfused thalassemics-Indian experience. *J Assoc Physicians India.* 1993;41:195–7.
 5. Arankalle VA, Chadha MS, Jha J, Amrapurkar DN, Banerjee K. Prevalence of anti-HCV antibodies in western India. *Indian J Med Res.* 1995;101:91–3.
 6. Jaiswal SP, Chitnis DS, Jain AK, Inamdar S, Porwal A, Jain SC. Prevalence of hepatitis viruses among multi-transfused homogenous thalassaemia patients. *Hepatol Res.* 2001; 19:247–53.
 7. Verma IC, Choudhury VP, Jain PK. Prevention of thalassemia: A necessity in India. *Indian J Pediatr.* 1992;59:649–54.
 8. Jaju N.- HIV seropositivity in multitransfused thalassemics during window period in Mumbai – Int. conf. AIDS 1998. 12 : 393
 9. M.Al. Sheyaab. A Batiecha et al. Prevalence of HBV, HCV, HIV in multitransfused Pts – Lab medicine, Jordon University hospital, Amman, Jordon.
 10. T N Williams, B wonke et al. A study of HBV, HCV prevalence and liver function in thalassemia patients and parents I J paed. Sep. 1992 Vol. 29. 1119-24
 11. Choudhary N, Naik S et al.- High frequency of TTTIS in thalassemia patients- I. J. Hematology and blood transfusion 1995 P. 115-18
 12. Shah SMA, Khan MT, et al. Prevalence of HBV and HCV in multitransfused thalassemia – Pakistan Journal of medical science Jul-Sep . 2005. Vol 21.
 13. Shaharam M. et al – Epidemiology of HBV, HCV, HIV in pts. with beta thalassemia major – in Iran a multicentric study. – Archieves of Internal medicine Vol 9. 2006.319-23