# A Study Of Prevalence Of HIV, HbsAg And HCV In Thalassemia Major Children

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**Abstracts**: Background: Thalassemias are a group of congenital anemias that have in common deficient synthesis of one or more of the globin subunits of normal human hemoglobin. They are one of the commonest inherited hemolytic disorders Beta Thalassemias major is the clinically most significant homozygous form resulting in reduced or absent beta chain production.In India there is variable carriage rate in different parts of the country. It is more common in Sindhis, Lohanas, Bhansalis and some tribal communities. State wise Punjab, Gujarat, West Bengal have higher incidence. Mainstay of management of thalassemia is 2-4 weekly packed red cell transfusion. Major complications of this treatment are iron overload and chance of contracting transfusion transmitted infections. Most concern amongst them are HIV infection, hepatitis B and C. Objectives of the study: To determine the prevalence of HIV, Hepatitis B and Hepatitis C in multi transfused thalassemia major children & to find some measures to reduce the risk of transfusion transmitted disease in them. Methods: Blood samples of patients attending thalassemia clinic of paediatric department of the Medical college of Saurashtra region were tested for HIV, HbsAg and HCV after obtaining written consent when they came for receiving blood transfusions.. The samples were tested with standard ELISA kit for detection of HIV 1 and 2, HCV and HbsAg on Biorad automatic ELISA reader and washer. Results: Incidence rate for HIV was **3.1%,** HCV was **7.8%**& HbsAg was **0.52%.**The increased sero positivity coincided with increased number of transfusions. There was simultaneous existence of more than one infection in 2 of the cases. Conclusion: Incidence of HIV positivity has decreased due to mandatory screening of all blood bags, proper selection criteria of donors and use of newer techniques for detection. HCV infection can causes chronic liver disease and increased risk of hepatocellular carcinoma. The low incidence of HbsAg positivity can be correlated with high proportion of the children getting vaccinated. The focus is now on minimizing window period donation. Hence selection of donors is of utmost importance. HIV minipool nucleic acid testing (MP-NAT), HIV-1 p24 antigen testing of donor's blood.Window period is reduced up to 6 days. [Oza T et al NJIRM 2012; 3(4) : 114-117]

**Key words:**Thalassemia Major, HIV, HCV, HbsAg, ELISA.

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**Introduction:** Thalassemias are a group of congenital anemias that have in common deficient synthesis of one or more of the globin subunits of normal human haemoglobin. They are one of the commonest inherited hemolytic disorders.[1]Beta Thalassemia major is the clinically most significant homozygous form resulting in reduced or absent beta chain production. They are probably the most common single gene disorder in the world.[2]

Thalassemias were first recognized by Thomas Cooley in 1925 in four children of the Greek and Italian immigrants. The word thalassemia is derived from the Greek word "Thalas", which means "Sea". The term was first coined by Whipple and Bordford in 1936 to indicate the relationship of the disease with the Mediterranean area.

The incidence of beta thalassemia is high in populations of Africans and Mediterranean origin. Significant number of cases exists in the Middle East, India, Pakistan and China. Disease caused by alpha thalassemia is common in Southeast Asia and china and sporadic in India.[3]

Approximately 3% of the world's population i.e. 150 million people carry beta thalassemia genes. In Indians frequencies between 3.5 and 14.9 have been reported.[4]

In India there is variable carriage rate in different parts of the country. It is more common in Sindhis, Lohanas, Bhansalis and some tribal communities. State wise Punjab, Gujarat, West Bengal have higher incidence.[5]

Mainstay of management of thalassemia is 2-4 weekly packed red cell transfusion. Major complications of this treatment are iron overload and chance of contracting transfusion transmitted

infections. Most common and significant among them are HIV infection, hepatitis B and C.

**HIV:** The first reported case of transfusion associated AIDS was in an 18 months old infant who had been transfused repeatedly at birth.[6] Thalassemia with HIV is a terrible combination of hereditary and acquired disease. Most countries adopted universal screening of blood bags for HIV1 and 2 since 1985. The usual window period of about 45 days can be brought down to around 15 days by recently invented nucleic acid amplification technology (NAT).[7]

Proper screening and self-exclusion of high risk donors and encouraging repeat donors is another way. Transfusion of whole blood , packed red cells, platelets, leucocytes, clotting factors and plasma- all are capable of transmitting HIV infection.

**Hepatitis B** is now preventable by vaccination.. For detection of infection HbsAg is most commonly used. Anti HbsAg response develops 22-75 days after exposure.

**Hepatitis C** is now widely accepted as the main causal agent in the blood borne non - A non B hepatitis. It may progress to cirrhosis and hepatocellular carcinoma after many years.[8] as more and more thalassemics are living up to adulthood-these complications become significant.

Transfusion transmitted diseases add to the misery of multitransfused thalassemia Children and create additional burden to the healthcare system. So there should be proper assessment of the magnitude of the problem. This will help to provide an optimally safe blood transfusion service.

**Material and Method:** Blood samples of those patients frequently attending thalassemia clinic of paediatric department of the Medical college of Saurashtra region (most of the patients from Rajkot city, district and surrounding places) were tested after obtaining written consent when they came for receiving blood transfusions in the Blood Bank. The samples were tested with standard ELISA kit for detection of HIV 1 and 2, HCV and HbsAg on Bio-Rad automatic ELISA reader and washer.

The details of the patient's clinical diagnosis, H/O number of previous transfusions, H/O immunization against hepatitis B and its schedule regimen were noted before the collection of the sample. It was observed that most of the children have given history of taken transfusion from unauthorized sources, in case when they could not get blood of their group and sometime due to social circumstances

**Result:** The tests of 193 thalassemia major children visiting the blood bank for blood transfusions were performed during the period from June 2009 to April 2011 and data are analysed.

**Table -1: Distribution of thalassemic children according to age and number of Transfusions taken**

| No. of Transfusion | Age groups (in years) | | | | | | |
|---|---|---|---|---|---|---|---|
| | <2 | >2-5 | >5-8 | >8-12 | >12-16 | >16 | Total |
| 0-50 | 03 | 46 | 07 | 06 | 00 | 01 | 63 |
| 51-100 | 00 | 08 | 27 | 16 | 05 | 01 | 57 |
| 101-150 | 00 | 00 | 01 | 19 | 08 | 00 | 28 |
| 151-200 | 00 | 01 | 00 | 06 | 09 | 02 | 18 |
| > 200 | 00 | 00 | 00 | 03 | 10 | 14 | 27 |
| Total | 03 | 55 | 35 | 50 | 32 | 18 | 193 |

In our study youngest thalassemic child was of 7 months old female and eldest thalassemic patient was a 30 years old male.

**Table 2: Anti HIV, HbsAg, Anti HCV Seropositivity among thalassemic children**

| Total patients | Anti HIV positivity | HbsAg Positivity | Anti HCV Positivity |
|---|---|---|---|
| 193 | 06 | 01 | 15 |
| 100% | 3.1% | 0.52% | 7.8% |

Among the 06 HIV positive patients 2 are positive for HCV also. So the total no of patients who are reactive for any of these three viral diseases are 22 (11.38%). Total 171 patients (89.62%) are free from all these 3 diseases.

**Discussion:** Transfusion transmitted infections (TTIS) had always been a major problem in multi transfused patients (including thalassemia patients) in the past. So the magnitude of the problem was always a topic for various studies. With the advent of improved technology and universal screening of the blood, the risk is now decreased but definitely present. The chance of getting infected for a multitransfused thalassemic is variable in different parts of the world according to the prevalence among general population and also safety of blood transfusion policy. The New England journal of medicine in 1996 quantities the risk of giving blood in the window period was for HIV 1 in 4,93,000, for HBV 1 in 63,000 for HCV 1 in 1,03,000.[9]

The estimated risk in USA was 1 in 16,10,000 for HCV, 1 in 2, 69,000 for HBV, and 1 in 17,80,000, for HIV.10 In Germany the risk of an undetected infection in 2002 was 1 in 27,70,000 for HIV ,1 in 2,30,000 for HBV and 1 in 6,70,000 for HCV.[11] They have further reduced this risk by implementing Nucleic acid amplification (NAT) testing.[7] In Italy there is high prevalence of thalassemia .There the risk of TTI as found in a study between 1994 and 1999 was estimated to be 2.4 /million donation for HIV, 15.8 /million donation for HBV and 4.5 /million for HCV.[12]

Studies of Anti HIV Antibody positivity by S.K.Bichile[13] shows 6%, Chakrabarti S[14] 0%, Shaharam m[15] 0% and present study shows 3.1%
HIV had become very rare after testing became mandatory for HIV 1 in 1989 and HIV-2 in 1993.[16] Testing for HbsAg, anti-HCV and syphilis also serves as surrogate markers of high risk donors whose chance of being in the window period is more.

Studies of Anti HCV antibody positivity in Thalessemia major children by AmarapurkorD.N.[17] shows 17.5%, Chitis D.S.[18] 25.45%, Chakrabarti S.[14]5%,Shaharam m[15]19.6% and present study shows 7.8%. Hepatitis C is emerging as predominant transfusion transmitted infection now days. There is no vaccine for HCV till date. A major fraction of these anti-HCV positive children develop chronic liver disease. They may progress to cirrhosis or hepatocellular carcinoma after many years. Thalassemia patients are more prone to liver dysfunction due to hepatitis because their liver are already compromised due to iron overload.

Studies of HbsAg positivity in Thalassemia Major Children by S.K.Bichile[13]was 5.6%, Chakrabarti S[14]5%, Shaharam m[15]1.5% and present study shows 0.52%.Positivity rate was much high in pre vaccination era compare to today. About 82.9% of patients in present study have either completed 3 doses of vaccine or are undergoing vaccination.

**Summary :** In the present study of 193 patients with Thalassemia major attending the Paediatrics OPD of Medical college, Rajkot were screened for anti HIV antibody, HbsAg and anti-HCV antibody. 1. Incidence rate for HIV was **3.1%,** HCV was **7.8%**& HbsAg was **0.52%.**

Out of 193 patients 06 patients were found HIV positive. 05 were Male and 01 was female. The increased seropositivity coincided with increased number of transfusions. Two of them were HCV reactive too.

Out of 193 thalassemia children 01 was found HbsAg positive. He was a male patient. Incidence of HbsAg positivity turns out to be 0.52% . In present study 160 patients are vaccinated or undergoing Vaccination. 15 patients were found anti HCV antibody positive showing an incidence of 7.8%. 11 out of them were male and 04 female.

**Conclusion** Thalassemia children receiving multiple transfusions are at high risk of acquiring transfusion transmitted infections. Incidence of HIV positivity has decreased due to mandatory screening of all blood bags. Window period can be decreased by using improved diagnostic technology.

The low incidence of HbsAg positivity correlated with high proportion of the Children getting vaccinated. Ideally all patients should complete

vaccination for hepatitis B before starting transfusion.

At present HCV infection has higher incidence in thalassemics as there is no vaccination available. HCV infection causes chronic liver disease and hepatocellular carcinoma after years. Now thalassemics with optimum transfusion and chelation have life expectancy like non thalassemics. So these complications become significant.

The focus is now on minimizing window period donation. Donor awareness programme and providing a good questionnaire before blood donation can lead to self-exclusion of high risk donors. Purely voluntary donors are ideal for donation.

HIV Minipool nucleic acid testing (MP-NAT), HIV-1 p24 antigen testing has reduced the window period to 6 days Today's requirement is to prevent thalassemia by prior testing of couples and to provide optimum care to the thalassemics already born. Proper health education can make a difference in achieving this goal.

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