PREVALENCE OF HEPATITIS B AND HEPATITIS C VIRUS INFECTION IN MULTITRANSFUSED THALASSAEMIA MAJOR PATIENTS IN NORTH WEST FRONTIER PROVINCE

Shah SMA[1], Khan MT[2], Zahour Ullah[3] & Ashfaq NY[4]

ABSTRACT:

Objective: To determine the prevalence of hepatitis B & hepatitis C virus infection in multitransfused thalassaemia patients.

Study: A prospective study

Place and duration of study: Department of Pathology, Khyber Medical College Peshawar and Fatimid Foundation Peshawar from January 2000 to January 2001.

Patients and Methods: This study was carried out on 250 multitransfused thalassaemia major patients. They were screened for hepatitis B surface antigen (HBsAg) and anti hepatitis C virus antibodies (anti-HCV antibodies) by Enzyme Linked Immunosorbent Assay (ELISA). The patient's ages ranged from 1½ year to 19 years. Majority of the patients included in the study had received more than 10 transfusions. The males were 180 (72%) and the females were 70 (28%).

Results: Out of these 21 patients (8.4%) and 142 (56.8%) have been screened positive for HBsAg and anti HCV antibodies respectively.

Conclusion: It has been recommended that properly screened blood, using a reliable method like ELISA, be only transfused to thalassaemic subjects in order to avoid /reduce transfusion associated infection.

KEYWORDS: HBV, HCV, Infections, Thalassaemia, Transfusion

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INTRODUCTION

Thalassaemia is the commonest inherited haematological disorder in Pakistan. It has been estimated that over 4000 cases of transfusion dependent Beta thalassaemia major are born in Pakistan per year.[1] The carrier rate for beta thalassaemia major in Pakistan is reported to be 5.3%.[2]

Thalassaemic subjects commonly receive transfusions and thus are exposed to transfusion associated infections. Among these infections, hepatitis B and C are the most common. Hepatitis B is the most common viral infection affecting more than 300 million people worldwide.[3] Over 20 million people are infected annually with this virus globally and there are 350 million chronic carriers of hepatitis B virus. In Pakistan one out of every ten persons is a carrier of hepatitis B virus.[4] Sources of transmission include HBsAg positive family members or other close contacts including intravenous drug abusers, patients with renal failure, organ transplant and immigrants from areas of high carrier rate. Infection may be spread

1. S. Mukhtar Ali Shah
Pathology Department, Khyber Medical College, Peshawar
2. Muhammad Tahir Khan
Pathology Department, Khyber Medical College, Peshawar
3. Zahoor Ulla
PMRC, Research Centre Khyber Medical College, Peshawar
4. N.Yasmin Ashfaq
Pathology Department, Khyber Medical College, Peshawar

Correspondence:

S. Mukhtar Ali Shah
Senior Lecturer
Pathology Department
Khyber Medical College, Peshawar, Pakistan
E-mail: jan_sum73@yahoo.com

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by fomites, sharing of toothbrushes and abrasions, blood products including clotting factor concentrates, immunoglobulins, plasma derivatives obtained from unscreened blood.[5]

Hepatitis C Virus (HCV) infection is also common in multitransfused thalassaemic patients. Prevalence is higher in high-risk groups such as thalassaemics, haemodialysis patients, health care workers and intravenous drug users.[6] Currently there are about 200 million people worldwide who are infected with hepatitis C virus.[7] Blood transfusion is a well-documented route of transmission of hepatitis C virus.[8] In repeatedly transfused patients in Pakistan, the seroprevalence of hepatitis C virus is 60-90%.[9-11]

PATIENTS AND METHODS

In this study 250 transfusion dependent thalassaemia major patients were screened for hepatitis B and C viruses. The majority of the children who had received more than ten transfusions, were included in the study. The children belonged to different parts of North West Frontier Province. History, clinical findings with family history and other relevant information were noted.

Five ml venous blood was collected from each patient. Clear serum was obtained by centrifugation. The serum was transferred to a disposable container for HBsAg and anti HCV antibodies determination using ELISA technique.

RESULTS

These 250 patients hailed from 238 families. 135(56.7%) families were having one affected child. Two and three affected children were from 12(5.0%) and 91(38.3%) families respectively. Results are summarised in Table-I.

It has been found that 238 families were having a total of 977 children. The prevalence of thalassaemia in families is given in Table-I. Detailed results and other details like male, female and age group are shown in Table-II & Table-III respectively.

Clinical examination revealed that all the 250 cases had scleral icterus. Splenomegaly and hepatomegaly was present in 63.2 and 36.8%respectively, index being over 6cm and 4cm. Results are summarized in Table-IV.

The frequency of HBsAg and anti HCV antibody positive cases amongst male and female over various age ranges has been detected. It has been found that 21(8.4%) cases are surface antigen positive, females being more

Table-I: Distribution of thalassaemic cases in families

	No. of families	*Percentage*
One child per family	135	56.7
Two children per family	12	5.0
Three children per family	91	38.3

Table-II: Ratio of thalassaemic to normal children in families

No. of children affected	*Total No. of children*	*No.of affected children*	*Ratio*	*Percentage*
One child	550	135	1:4.1	24.5
Two children	62	24	1:2.6	38.7
Three children	365	273	1:1.3	74.8
	977	432	1:2.3	44.2

Table-III: Age and sex wise distribution of thalassaemia patients

Age (years)	*Male*	*Female*	*Total*	*Percentage*
0—5	72(28.8%)	25(10%)	97	38.8
5—10	76(30.4%)	31(12.4%)	107	42.8
10—15	29(11.6%)	12(4.8%)	41	16.4
>15	03(1.2%)	02(0.8%)	05	2.0
	180	70	250	

Table-IV: Clinical presentation of the cases

Entity	*Male N=180*		*Female N=70*		*Overall*
	N	*%*	*N*	*%*	*%*
Scleral icterus	180	100	70	100	100
Hepatomegaly	61	33.9	31	44.3	36.8
Splenomegaly	98	54.4	60	85.7	63.2

affected than males (14.2% and 6.1%) as shown in Table-V. The difference between males and females was highly significant($p<0.01$).

In contrast very high positivity has been detected for HCV antibodies, being positive in 142(56.8%) cases. Positivity for males has been detected to an extent of 48.3% while in females as 78.6%, as shown in Table-VI. The prevalence in both sexes was highly significant ($p<0.01$).

In our series of patients both hepatitis B surface antigen positivity and anti HCV antibody positivity has been detected to an alarming high level of 8.4 &56.8% respectively. It depicts an upward trend in the overall positivity both for HBsAg & Anti HCV antibodies with increasing age, which in turn is associated with increasing transfusions and thereby the risk of acquiring both the infections.

The results are also indicative of much higher probable prevalence of HCV amongst normal population than hepatitis B. Results reveal that male dominates female in all age groups. It may be due to gender preference, commonly seen in access to health care facilities.

DISCUSSION

Thalassaemia major patients are among the most commonly transfused persons in Pakistan. In this study 250 multitransfused thalassaemia major patients were tested for HBsAg and anti HCV antibodies by 3rd generation ELISA.

The prevalence of hepatitis B was 8.4%. This study is comparable with the study of Cacopardo and his colleagues who studied 152 Sicilian multitransfused thalassaemia major patients and found 8.0% positivity.[12] A study performed by Shah and Khan has shown the prevalence of 7.1%.[13]

In this study 142 (56.8%) patients were positive for anti-HCV antibodies. This study is comparable with the study of Resti & his colleagues from Germany who studied 78 polytransfused beta-thalassaemic children. The anti HCV status was correlated with acute and chronic non-A, non-B (NANB) hepatitis that developed during a follow-up of about 13 years. Anti HCV was present in 83.3% of children with acute NANB hepatitis and in 82.9% of those with chronic NANB hepatitis. The percentage of chronic evaluation was 56.7% for acute anti HCV positive NANB hepatitis and 50.0% for anti HCV negative NANB hepatitis.[14]

Ni-YH and his colleagues in United States studied 61 polytransfused thalassaemic children prospectively for 4 years. The results showed that in these children 26/61 (43%) contracted HCV.[15]

In another study Cacopardo and his colleagues in Germany tested the serum of 152 Sicilian multitransfused subjects for anti HCV anti bodies. It showed 47% positivity for anti HCV antibodies.[12] Bhatti et al. reported 60% positivity for anti HCV antibodies, which is also close to the present study.[16] Ahmad and Shamsi from Karachi have reported 46% positvity by screening 130 thalassaemia major patients.[17]

With the advent of proper screening in developed countries, blood transfusion is no longer a major route of transmission of these viral infections but in Pakistan, the risk of acquiring viral infections through transfusion is still very high.

Vaccination against hepatitis B can prevent this infection. Al-Fawaz and Ramia showed

Table-V: Hepatitis B surface antigen positivity rate in multitransfused thalassaemia cases

Age range	*Male N=180*			*Female N=70*			*Overall*
	N	*Positive*	*%*	*N*	*Positive*	*%*	*%*
1-5	72	2	2.8	25	4	16.0	6.2
6-10	76	7	9.2	31	2	6.5	8.4
11-15/>	32	2	6.2	14	4	28.6	13.0

Table-VI: Anti HCV antibodies positivity rate in multitransfused thalassaemia cases

Age range	*Male N=180*			*Female N=70*			*Overall*
	N	*Positive*	*%*	*N*	*Positive*	*%*	*%*
1-5	72	29	40.3	25	15	60	45.4
6-10	76	43	56.6	31	28	90.3	66.3
11-15/>	32	15	46.9	14	12	85.7	58.7

that 70% of thalassaemic children receiving hepatitis B vaccines were negative for HBsAg despite receiving a large number of blood transfusions.[18]

RECOMMENDATIONS

Thalassaemia major patients present a very serious public health problem in developing countries due to continuous requirement of large quantity of properly screened blood. Unfortunately blood transfusion services in Pakistan are not very well organized. Keeping these in mind the following recommendations are made:

- Proper screening of blood and blood products for hepatitis B and C infections with ELISA to avoid false negative results.
- The general public should be educated about the donation of healthy relatives blood after proper screening and use of blood from professional donors should be discouraged.
- Vaccination of children against hepatitis B should be encouraged.
- Masses should be educated through media, about the risk of hepatitis through the use of contaminated syringes and needles etc. General public should be educated to insist on the use of new disposable syringes when in need.

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