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Viral Hepatitis C in Thalassaemia: Determination of Antibody HCV Frequency in Mutitransfused Thalassaemia Patients

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ABSTRACT

Background: Thalassemias are a group of genetic blood diseases. These patients are blood transfusion dependent because of genetic inability to produce hemoglobin according to body needs. Due to repeated transfusions, these patients are vulnerable to HCV, HBV and HIV like blood transmitted diseases. The purpose of this study is to determine post transfusion HCV frequency in these patients. **Objective:** To assess prevalence of antibody HCV in multi-transfused Thalassaemia patients. **Study Setting:** The study was conducted at Thalassaemia Center, DHQ Hospital Faisalabad located in Central Punjab, Pakistan. The record of the Thalassemia children registered in this center during 1st Jan 2012 to 31st Dec 2014 was reviewed. **Study Design / Methodology:** A descriptive cross sectional study was conducted on 416 Thalassemia children registered in Thalassemia Center DHQ Hospital Faisalabad. Out of these 379 children were included while 37 excluded due to incomplete record. The demographic data, blood transfusion history and lab tests details were taken from patient files. The HCV diagnostic laboratory techniques used were Rapid manual, confirmed by Enzyme Linked Immunosorbent Assay (ELIZA). **Results:** Out of 379 Thalassemia patients, HCV positive found were 123 (32.45%). The study population age was in range of 1- 19years while age range of HCV affected group was 5-19 years. Out of total 379, male were 235 (62%) and female were 144 (38%) while in total 123 HCV affected group 82 (66.67%) were male and 41 (33.33%) female. In total of 379 Thalassemic children having multiple transfusions, 123 (32.45%) were HCV +ve . Among 353 Thalassemic children having positive blood groups, 111 (31.44%) were HCV +ve while 12 (46.15%) were HCV +ve in 26 children with negative blood groups. Among 235 male, 82 (34.89%) were HCV +ve and 41 (28.47%) HCV +ve in 144 female children. Hepatomegaly was 75% in HCV +ve while 65% in HCV –ve groups. The splenomegaly was almost 80% in all groups. **Conclusion:** Despite use of screened blood transfusions in this center, still there is alarming proportion of HCV affected blood receiving patients. In this study Antibody HCV prevalence was higher (46.15%) in Thalassemic children with negative blood groups than (31.44%) positive group children. In total HCV +ve patients, 2/3 (66.67%) were male and 1/3 (33.33%) female group. This study warrants attention to improve HCV diagnostic and instrument sterilization techniques to minimize the risk of HCV infection.

Key words: Thalassemia, Blood Transfusion, Prevalence, Hepatitis-C, Pakistan, Faisalabad.

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INTRODUCTION

The Thalassemias also known as Cooley's Anemia, are a diverse group of genetic blood diseases characterized by absent / decreased production of haemoglobin, resulting in microcytic anemia. It occurs due to genetic defects in synthesis of haemoglobin/globulin chains.[1] There are two most serious blood transfusion dependent major types; Alpha Thalassemia and Beta Thalassemia. The victims of these types require regular blood transfusion to maintain their health to survive along with iron chelation therapy.[2] To sustain good quality of life in adulthood and maintenance of growth during childhood, the transfusion of red blood cells are essential.[3-4] HCV, HBV and HIV can occur due to repeated blood transfusions because of improperly screened blood and unsterilized instrumentation. HCV is most common cause of post-transfused hepatitis among Thalassemia patients.[5,6]

In many developed countries, HCV is responsible for chronic hepatitis, hepatic failure, cirrhosis and hepatocellular-carcinoma.[7,8] Various studies

confirm prevalence of HCV in blood donors all over the world. Most of the Thalassemia patients on receiving HCV infected blood, develop anti- HCV antibodies and other signs of Hepatitis-C.[9] In Thalassemia patients iron over load is inevitable and HCV infection in these patients is known to have potentiating effect in hepatic fibrogenesis.[10] All developing countries including Pakistan are facing HCV and HBV infection as one of the major public health problem.[11,12] HCV infection has higher prevalence rates than HBV in multi transfused Thalassemic patients because of availability of hepatitis-B vaccine and strict compliance of blood donor screening protocol.[13] The rates of HCV infection in Thalassemia patients in different countries ranges between 12% and 85%.[2] In Pakistan HCV and HBV infection rate in Thalassemia patients is 48.6%,[14] Hepatitis B&C infection and different genotypes of hepatitis.[15] Despite the tremendous and impressive medical and scientific development during last two to three decades, viral hepatitis especially HCV &HBV continue to pose threat to public health in general at global level.

So far no study has been conducted on this subject in this area. Therefore, this study has been conducted to determine frequency of HCV infection in blood transfusion dependent Thalassemic patients.

METHODOLOGY

This descriptive cross sectional study was conducted at Thalassemia center DHQ Hospital Faisalabad which is located in Central Punjab, Pakistan. This Hospital is a teaching hospital affiliated with Punjab Medical College Faisalabad. 416 Thalassemia children are enrolled in this center. The patient files of those Thalassemia children were reviewed who availed blood transfusion services regularly from 1st Jan 2012 to 31st Dec 2014.Among total (416) enrollment, 37 were not included in study due to incomplete record, so only 379 patients were included in study group. The patient diagnosis for antibody HCV was made by rapid manual screening confirmed by ELIZA / Diagnostic PCR Tests while Hepatomegaly /Splenomegaly by examination confirmed by ultrasonography.

Descriptive statistics regarding demographic data, medical and blood transfusion history, laboratory techniques and diagnosis were recorded while analytical data was phrased in tables for analysis. Prevalence was calculated in percentage while confidence interval (95%) with SPSS software version 13.0. The chi- square and Student's t-test was used for comparison of data.

RESULTS

The record of 416 Thalassemic children registered in Thalassemia Center DHQ Hospital Faisalabad during 01st Jan 2012 to 31st Dec 2014 was reviewed. Among them, only 379 patients were included in this study while 35 patients were not included due to incomplete record.

Table 1: Detail of Multitransfused Thalassemia Patients

Sr No.	Blood Group	Male n & %	Female n & %	Total % of 379	Mean Age	% Liver size +	% Spleen size +
1	A +ve	49 =66.22%	25 =33.78%	74 =19.53%	M=7.38yrs F =7.23yrs	65-75%	80 %
	A –ve	05 =45.45%	06 =54.55%	11 =02.90%	-do-	-do-	-do-
	Total	54 =63.53%	31 =36.47%	85 =22.43%	-do-	-do-	-do-
2	B +ve	72 =59.50%	49 =40.50%	121 =31.93%	M=8.75yrs F=9.92yrs	-do-	-do-
	B –ve	05 =71.43%	02 =28.57%	07 =01.85%	-do-	-do-	-do-
	Total	77 =60.16%	51 =39.84%	128 =33.77%	-do-	-do-	-do-
3	A B +ve	20 =66.67%	10 =33.33%	30 =07.92%	M=7.2yrs F=5.79yrs	-do-	-do-
	A B –ve	01 =100.00%	00 =00.00%	01 =00.26%	-do-	-do-	-do-
	Total	21 =67.74%	10 =32.26%	31 =08.18%	-do-	-do-	-do-
4	O +ve	79 =61.72%	49 =38.28%	128 =33.77%	M=8.4yrs F=8.78yrs	-do-	-do-
	O –ve	04 =57.14%	03 =42.86%	07 =01.85%	-do-	-do-	-do-
	Total	83 =61.48%	52 =38.52%	135 =35.62%	-do-	-do-	-do-
	Grand Total	235 **=62.00%**	144 **=38.00%**	379		-do-	-do-

Source: Thalassemia Center DHQ Hospital Faisalabad.

Table 2: Detail of HCV Antibody Prevalence among multi-transfused Thalassemia Patients

SR. No.	Blood Group	Male HCV n & %	Female HCV n & %	Total % of n=123	Mean Blood Transfusions	Age of HCV+ Diagnosis
01	A +ve	06 =66.67%	03 =33.33%	09 =07.32%	02 pints /month	09±SD 03
	A –ve	02 =33.33%	04 =66.67%	06 =04.88%	-do-	06±SD 05
	Total	08 =53.33%	07 =46.67%	15 =12.20%	-do-	
02	B +ve	37 =78.72%	10 =21.28%	47 =38.21%	-do-	09±SD 03
	B –ve	03 =75.00%	01 =25.00%	04 =03.25%	-do-	06±SD 05
	Total	40 =78.43%	11 =21.57%	51 =41.46%	-do-	
03	AB +ve	06 =60.00%	04 =40.00%	10 =08.13%	-do-	09±SD 03
	AB –ve	00	00	00	-do-	06±SD 05
	Total	06 =60.00%	04 =40.00%	10 =08.13%	-do-	
04	O +ve	27 =60.00%	18 =40.00%	45 =36.59%	-do-	09±SD 03
	O –ve	01 =50.00%	01 =50.00%	02 =01.63%	-do-	06±SD 05
	Total	28 =59.57%	19 =40.43%	47 =38.21%	-do-	
	Grand Total	82 =66.67%	41 =33.33%	123 of 379 =32.45%	-do-	
HCV Antibody Prevalence	**Positive** Blood Groups	**Total=** 353	**HCV +ve** = 111	**Percentage** **=31.44%**	**Overall Prevalence in** +ve & -ve Blood Groups	**32.45%**
	Negative Blood Groups	26	= 12	**=46.15%**		

Source : Thalassemia Center DHQ Hospital Faisalabad.

As shown in table-1, among total 379 patients, (62%) n-235 were male and (38%) n-144 female. The mean age of study group was 07.50 yrs±SD 05. The mean age of HCV antibody positive patients was higher than HCV negative patients i.e, 09 years±SD 03 in HCV positive while 06 years ± SD 05 in HCV negative patients . There was no significant statistical difference between male and female treatment behavior.

As shown in table-2 The majority of the patients were diagnosed at the age of 07years ±SD 01. The average no of pints of blood transfused per month per patient were 02 pints. Among 353 positive blood groups,101 were (28.61%) HCV +ve while in blood group-ve n=26, the HCV +ve were12 i.e. (46.15%). The over all prevalence of antibody HCV was 32.45%. Hepatomegaly in HCV+ve was 75% while 65 % in HCV –ve patients. Splenomegaly was almost 80 % in both groups.

DISCUSSION

The patients suffering from major types of Thalassemia, mostly need regular blood transfusions to survive and maintain their health. In Pakistan, there are about 70,000 patients with Thalassemia while 6,000 children born with Thalassemia are added every year.[17] The carriers of Beta Thalassemia are about 8-10 million and carrier rate of Thalassemia is 6-10% in Pakistan.[18] The HCV infection rate in Thalassemia patients is 48.6% in Pakistan.[15] In our study antibody HCV infection rate in Thalassemia patients is 32.45% which is lower than most of the studies conducted at national level and comparable with studies conducted in other countries at international level.

Globally the prevalence of HCV in Thalassemia patients ranges between 12% and 85%.The prevalence of HCV in blood transfusion dependent Thalassemia patients is 47.0% in Italy.[19] 16.7% in India[20] and 22.4% in Malaysia.[21] Although in our study setting, the blood is properly screened for antibody HCV but still Thalassemia patients can get hepatitis-C on receiving HCV infected blood during window period of the donor.[22] In study conducted by Nazir S, prevalence of HCV in Beta Thalassemia patients in tertiary care hospitals in Lahore was 41% with mean age of 8.5 years.[23] In another study of five year trend analysis of seroprevalence of blood borne viral infections by K V Ramana, HCV showed an increasing trend during this period.[24] The rate of HCV significantly high and also higher than HBV in Thalassemia patients in Roopan Jain

study,[26] 27.5% HCV prevalence in Thalassemia patients in study by Azita A,[25] 21.76 % HCV in multitransfused Thalassemic patients in District Sawat,[27] 42.1% HCV infection in Thalassemia patients in study by Amjad Iqbal,[28] 40.5% HCV infection in multitransfused thalassemia patients in Egypt,[29] 29.52% HCV prevalence in Gujrat India[30] and 37.11% HCV prevalence in Thalassemic patient in Upper Egypt,[31] the results of these mentioned national and international studies are consistent with results of this study.

CONCLUSION

Despite blood screening of blood donors, post transfusion viral infections are still badly occurring. Patients with transfusion dependent Thalassemias are prone to HCV and possibility of developing liver disease is very high. This study showed that more you receive blood transfusions more are the chances to acquire HCV infection. The antibody HCV prevalence of 32.45% in Thalassemia patients of this study set up is high and needs to be minimized.

RECOMMENDATIONS

There is strong opinion that as a pre-requisite to minimize transmission of viral hepatitis in Thalassemia patients, government should promote and implement control programs for viral hepatitis through spreading awareness, implementation of mandatory Hepatitis screening among healthy blood donors and promoting vaccination, sterilization, national voluntary non-remunerated blood transfusion services.

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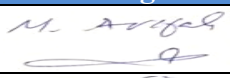
Dr. Muhammad Arif Ali	Researcher, Data Collector	
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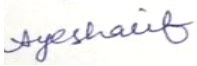
Dr. Ayesha Arif	Statical supervisor	
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