

Prevalence of Hepatitis B and C in Thalassemic Patients and its Relation with Type of Thalassemia, Frequency of Blood Transfusion, and Spleen Status

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Abstract

Background: Thalassemia is one of the most common inherited diseases; it is an inherited impairment of hemoglobin production, in which there is partial or complete failure of the synthesis of globin chain. Hepatitis B and hepatitis C had emerged as a major cause of end-stage liver disease. Both the viruses are transfusion-transmitted disease. **Objective:** The objective of the study is to assess the prevalence of hepatitis B and C viruses in thalassemic patients and its relation with type of thalassemia, blood transfusion, and spleen status. **Material and Methods:** A cross-sectional study was conducted on 100 multitransfused thalassemic patients for 2 months from November 1, 2016, to January 1, 2017. Test for HBsAg, HBcAb, IgG and IgM for screening of hepatitis B virus (HBV). HBcAb. by VIDAS method and confirmation by reverse transcription polymerase chain reaction for hepatitis C virus (HCV) was done. There is no family history of HBV and HCV infection nor vaccination history of the studied population. **Results:** Twelve (12%) patients had a positive HBcAb, while 3 (3%) had HBsAg positivity, higher percentage of HCV-infected patients (91%) received regular every 1-month blood transfusion, 50% of hepatitis C patients had splenomegaly, and 20.7% had splenectomy. **Conclusion:** Good and sensitive screening tests and stringent donor selection processes are required for the better control of this transfusion-transmitted infection among thalassemic patients.

Keywords: Hepatitis Bs Ag, hepatitis C Ab, Splenectomy, thalassemia

INTRODUCTION

Thalassemias are a group of genetic diseases, which result from a reduced rate of synthesis of α or β -chain.^[1] In thalassemia, the difference of globin chain production results in red blood cell loss due to increased destruction in the bone marrow and in the peripheral blood (hemolytic anemia).^[2] There are two different chains of protein in the hemoglobin a molecule, α and β and either can be reduced.^[3] Thus, thalassemia is classified broadly into α -type, when the production of α -globin is reduced, and β -type when the β -globin production is deficient.^[4] The most common type is β -thalassemia.^[5] Normally, there are two alpha gene loci on chromosome 16.^[6] Each individual has four α -globin gene, two from the paternal chromosome, and the others from maternal chromosome. This results in four possible genotypes, each resulting in different clinical syndromes.^[7] If one is deleted, the silent carriers of α -thalassemia in which there are no clinical abnormalities are seen. If two are deleted, the patient exhibits the feature of α -thalassemia trait

in which there is a mild hypochromic anemia, if three genes are deleted resulting in hemoglobin H disease, while if four genes are deleted resulting in hydrops fetalis with dead fetus.^[8] β -thalassemia is an autosomal recessive disorder in which there is reduced β -chain production, which can be caused by many types of mutations in the gene responsible for the β -chain of hemoglobin tetramer.^[9] The β -globin gene is located in the chromosome 11.^[10]

Hepatitis C virus (HCV) is a blood-transmitted virus. Most epidemiological studies have focused on group at risk of infection such as thalassemic patients due to multiple blood transfusions. Moreover, HCV is now considered as the leading cause of posttransfusion hepatitis worldwide.^[11] Repeated

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blood transfusion in thalassemic patients is necessary for their survival; however, such transfusions increase the exposure not only to HCV but also other blood-borne viruses (hepatitis B virus (HBV), hepatitis G virus, and human immunodeficiency virus (HIV)).^[12] It was stated that the second leading cause of death in thalassemic major patients over 15 years of age is liver disease, due to viral hepatitis.^[13] Furthermore, the infection with HCV may not induce immunity, in which they documented that multiple distinct episodes of acute hepatitis were observed in individuals of polytransfused thalassemic patients and re-infection with different strain.^[14]

HBV is also risk for these patients but the risk is diminished, especially in a developed country after the introduction of HBV vaccination.^[15]

The aim of this study was to assess the prevalence of hepatitis B and hepatitis C viruses in thalassemic patients and its relation with blood transfusion and spleen status.

MATERIALS AND METHODS

This study is a case-control study, conducted at Babylon hospital for maternity and pediatrics/thalassemia center. The duration of the study was 2 months, extended from November 1, 2016, to January 1, 2017.

One hundred patients were collected randomly during each visit.

The data which were recorded for each patient include age, sex, duration of the disease, family history of thalassemia, type of thalassemia either major or intermedia, frequency of blood transfusion, spleen status, family history of HBC and HCV infection, and vaccination history.

All patients were known with thalassemia diagnosed on the basis of clinical assessment and laboratory examination that confirmed by hemoglobin electrophoresis.

For the detection of viral hepatitis, VIDAS method to detect HBsAg, HBc IgG, IgM to identify HBV infection, anti-HCV antibody, and real-time polymerase chain reaction to detect hepatitis C viral infection.

Data were analyzed using statistical package for the social sciences version 24 (SPSS, IBM Company, Chicago, USA). Data were presented in simple measures of number, percentage, mean, standard deviation, and range (min-max).

RESULTS

A cross-sectional study of 100 patients with thalassemia was conducted which included 49 males and 51 females, with mean age was 13.5 years, ranging from 1 to 46 years, mean duration of the disease was 9.02 years, ranging from 1 month to 28 years, 80% of patients have β -thalassemia major while 20% have thalassemia intermedia.

Sixty-two percent of total thalassemic patients in this study have a positive family history of thalassemia, 53% of

β -thalassemic patients have positive family history, whereas only 9% of thalassemic intermedia patients have a positive family history as shown in Table 1.

From these 100 patients, 96% of patients are transfusion dependent, majority of patients (82%) receive blood once every month, 4% do not receive blood transfusion till the time of study, 3% have blood transfusion once every 3 months, 6% have twice blood transfusion every month, 4% have once blood transfusion every 2 months, and 1% have one donation every 3 months.

Most patients with β -thalassemic major patients receive once monthly blood transfusion as shown in Table 2.

Regarding the status of spleen, 14% have no splenomegaly, 68% with splenomegaly, and 18% were splenectomized. High percentage of splenomegaly and splenectomy occur in thalassemia major than thalassemia intermedia as shown in Table 3.

Hepatitis B surface antigen was positive in 3% of patients, whereas hepatitis C antibody was positive in 12% of patients with higher percentage in thalassemia major than thalassemia intermedia as shown in Table 4 and Figure 1.

Majority of HCV-infected thalassemic patients, 11 of 12 (91.7%) received regular once monthly blood transfusion and 9 of 12 (75%) had thalassemia major whereas the other 3 (25%) had thalassemia intermedia, 6 (50%) had splenomegaly, and 5 (20.7%) had splenectomy [Table 5].

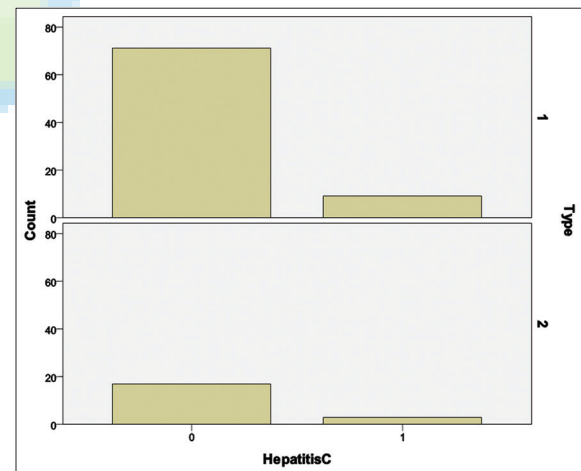


Figure 1: Percentage of hepatitis C infection in thalassemia major and intermedia. Type 1: Thalassemia major, 0: No infection. Type 2: Thalassemia intermedia, 1: Infection

Table 1: Percentage of thalassemic patients with positive family history

Thalassemia	Family history		Total
	Negative	Positive	
Major (%)	27	53	80
Intermedia (%)	11	9	20
Total (%)	38	62	100

Table 2: Frequency of blood transfusion in total thalassemic patients per months

Thalassemia	Frequency of blood transfusion per 1 month						Total
	0.0	0.3/month	0.5/month	1/month	2/months	3/months	
Major	0	0	2	73	4	1	80
Intermedia	4	3	4	9	0	0	20
Total	4	3	6	82	4	1	100

Table 3: Percentage of splenomegaly and splenectomy in total thalassemic patients

Thalassemia	Spleen status			Total
	No splenomegaly (%)	Splenomegaly (%)	Splenectomized (%)	
Major (%)	12	52	16	80
Intermedia (%)	2	16	2	20
Total (%)	14	68	18	100

Table 4: Percentage of positive hepatitis C infection in types of thalassemia

Thalassemia	Hepatitis C infection		Total
	Negative	Positive	
Type			
Major	7	9 (75)	80
Intermedia	17	3 (25)	20
Total	88	12	100

Table 5: Percentage of splenomegaly and splenectomy in hepatitis C virus-positive patients

	Hepatitis C infection		Total
	Negative	Positive	
Spleen			
Normal	13	1 (8.3)	14
Enlarged	62	6 (50)	68
Splenectomy	13	5 (20.7)	18
Total	88	12	100

DISCUSSION

Thalassemic patients have inherent defect in the synthesis of hemoglobin and this leads to anemia. The patients require long-term and multiple blood transfusions to decrease the complications of severe anemia and prolong their survival rate. However, this recurrent blood transfusion increases the risk of transmission of transfusion-related viruses – hepatitis B and C viruses.^[15]

In our study, the prevalence of hepatitis C was 12%, comparing with Abed study^[16] which was done in Ibn-Al-Balady hospital/Baghdad in 2010; she found that 51 patients (46%) sera were confirmed positive for anti-HCV antibodies which was higher than that of our study percentage. Hussain study^[17] found that 75 (41.7%) children were hepatitis C positive, which is very higher than the above studies indicating poor screening methods used for HCV

antibody during that period of the study which was done in 2002–2003. In many countries, the prevalence of HCV infection in thalassemic patients is different. In India, it is 16.7%;^[18] in Malaysia, it is 22.4%;^[19] in Italy, the prevalence of hepatitis C in thalassemic patients was 47.0%;^[20] and in Iran, it is 63.8%.^[21]

Regarding the prevalence of hepatitis Bs antigen, our study was 3% which is similar to Chattopadhyay study^[22] which was 14 (3.69%) HBsAg-positive patients.

Most of viral hepatitis C-positive patients, 11 of 12 (91%) received once per month blood transfusion, 6 of 12 (50%) had splenomegaly, 5 of 12 (20.7%) were splenectomized which was similar to the Hussain study,^[17] who had noticed that the blood transfusions numbers taken by anti-HCV-positive patients, and splenectomy were significantly higher than that of the patients with anti-HCV negative.^[23]

CONCLUSION

Strict universal safety precautions including vaccination against hepatitis B can reduce the transmission of these blood-borne pathogens. Despite the screening of blood donors, HCV infection remains an important cause of viral infection among thalassemic patients with prevalence of 12% in our study. Health awareness leads to the reduced spread of HCV infection. Regular screening for these pathogens, early diagnosis during asymptomatic period, and proper treatment with antiviral drugs can reduce the morbidity and complications of chronic.

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Conflicts of interest

There are no conflicts of interest.

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