Original Article

Prevalence of Hepatitis B and Hepatitis C Among Patients of Thalassemia Major at a Teaching Hospital in Larkana

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ABSTRACT

Objective: To assess the frequency of Hepatitis B and Hepatitis C among patients of Thalassemia Major at a teaching hospital in Larkana.

Study Design: Descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the conducted at Paediatric department, Shaheed Benazir Bhutto University Hospital, Larkana from June, 2017 to June, 2018.

Materials and Methods: In the study total of 237 children with beta Thalassemia were selected by apply Non-probability consecutive technique sampling.

Results: Prevalence of hepatitis B and C, was observed in 31(%) and 73(%) among thalassemia patients. More viral infections Hepatitis B and C seemed in the male in male than female and low socioeconomic population. Data were analyzed by using SPSS 19 version.

Conclusion: Hepatitis B and C are quite more prevalent among Thalassaemic patients. It is significant, an alarming circumstance having a lot of aspects behind it, but it needs to be taken immediately. So a great need for proper screening of blood before transfusion to such patients and educational programs for these patients and their parents.

Key Words: Thalassemia; Spleenectomy; Hepatitis B; Hepatitis C; Child

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INTRODUCTION

Thalassemia major (an inherited autosomal recessive disorder) is the most common hematological disorder characterized by a genetic insufficiency in the formation of beta-globin chains.[1] Thalassaemia major is diagnosed early in childhood when the affected child develops symptoms like pale skin, irritability, growth retardation, swelling of the abdomen due to enlargement of the liver and spleen (hepatosplenomegaly) with jaundice, even as in the homozygous state result severe transfusion-dependent anemia. [2]

Globally, the increased incidence rate has seemed in South East Asia, the Indian subcontinent, and Burma.

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In Pakistan, the most prevalent inherited disorders and an estimate, over 4,000 cases of thalassemia are born per year in the country.[3,4] As this is transfusion-dependent, these patients require regular blood transfusion within the first two years of life to prevent severe anemia and its physical consequences by maintaining hemoglobin level above 10 gm/ dl. Overall regular blood transfusions and chelation therapy improve the survival of thalassemia major patients but it has potential threats of acquiring lethal infections like absorptive iron overload and transfusion-transmitted infections (TTIs) such as hepatitis B & C virus (HBV & HCV) infection as well.[5] According to data from World Health Organization, about 170 million people are infected by HCV while approximately 240 million people are chronically infected with HBV in the world.[6]

Globally, hepatitis prevalence rates in thalassemic patients range from 0.3% to 5.7% for hepatitis B surface antigen (HBsAg) positivity,[7] and that around 55%-85% would progress to chronic liver disease, 15%-30% would progress to cirrhosis and 1%-5% are expected to die due to decompensated cirrhosis and HCC.[8]

A Swat study reported that 21.76% of patients with thalassemia were found to have hepatitis C virus (HCV) antibody positive. While another study documented that out of 180 beta-thalassemia major patients were

enrolled at the two sites. Out of these 75 (41.7%), children were hepatitis C positive. [9]

Our nation is also severely hit by this infection and its burden is still increasing because of lack of awareness regarding blood transfusion safety measures, use of unsterilized syringes, barber shaving, tattooing, injury with contaminated sharp instruments, and sexual abuse. In this scenario, patients with thalassemia major are at greater risk of hepatitis C due to blood transfusion from donors infected by HCV and HBV whereas HCV is among the leading causes of severe liver anomalies, including hepatic carcinoma and cirrhosis-related end-stage liver disease. In Pakistan, both Hepatitis B and C are too severe public health problem .[10]

It is suspected that HCV is responsible for the majority of cases of non-A, non-B hepatitis post-infection in a patient with thalassemia major. According to one study, the average weight of hepatitis B antigen in the pediatric population was 2.4% (range 1.7–5.5%) and 2.1% (range 0.4–5.4%) for hepatitis C antibodies. But regarding 13-TM patients the condition is severe.[11]

MATERIALS AND METHODS

Study Design: Cross–sectional descriptive study.

Study Setting: Paediatric Department, Shaheed Benazir Bhutto Medical University Teaching Hospital, Larkana.

Study Duration: During the period of 01-06-2017 to 15-06-2018.

Sample Size: The sample size was calculated by using the WHO Sample size calculator taking the prevalence of HCV 5.88%[12] with a confidence level of 95% and margin of error of 0.05 then the estimated sample size was n= 237

Sampling Technique: Non-probability consecutive sampling.

Sample Selection:

Inclusion Criteria:

· Patient of age between 2 months up to 12 years
· Patients of both genders
· Confirmed diagnosis of Beta Thalassemia Major as per operational definitions
· The willingness of parents by providing written informed consent.

Exclusion Criteria:

· Age <2 years and >12 years
· Previously diagnosed case of HBV/ HCV
· The child already vaccinated for HBV
· The child already taking interferon therapy of HCV
· HIV infected/ AIDS & Fungal infections
· Taking corticosteroids for at least six weeks

Data Collection Procedure: Patients diagnosed as cases of Beta thalassemia major (meeting the inclusion criteria) will be enrolled in the study from the pediatrics department after informed consent has been given by the parents of the patient. They will be explained the purpose and procedure of the study. Data will be collected on a pre-defined questionnaire containing demographic variables like name, age, gender, residence, and socio-economic status of parents. Other variables include the duration of illness, weight, height, BMI (weight in Kilograms divided by height in meters square) & the number of transfusions required per month.

A blood sample of 5 ml will be taken under strict sterile technique for Hepatitis B virus surface antigen & Hepatitis C virus antibody (both through ELISA). Positive samples will be confirmed using the DNA PCR technique. The data on the outcome variable (frequency of Hepatitis B and Hepatitis C positivity) will be collected on proforma.

Statistical Analysis: SPSS version 19 was used for data entry and analysis. Continuous variables like age, duration of illness, weight (Kgs), height (meters), BMI, etc was analyzed as mean ± Standard deviation. Frequencies & percentages were expressed for gender, residence, the frequency of Hepatitis B and C positivity (outcome variable), etc. Stratification was done further to control effect modifiers like age, gender, socioeconomic status of parent, etc. Chi-square was applied. P-value < 0.05 was taken as significant.

RESULTS

A total of patients were included in the study. The mean age of the patients was found to be 6.13 ± 2.75 years and range 2 to 12 years. Patients were further categorized according to age groups into 2 groups i.e. 2-6 years showed more frequency 155(65.5%) and 7-12 group showed 82(34.5%). Table 1. The gender-wise male participation is more than 140(59%), while female participation showed 97(41%). Also, most of the patients had lower socioeconomic status, details are summarized in table 1.

Table No.1: Frequencies Distribution Among Patients Among Thalassemia

Frequencies Distribution Among Patients Among Thalassemia			
Age of patients	2-6 years	155	65.4
	7-12 years	82	34.5
Gender of patients	Male	140	59
	Female	97	41
Socio-economic Status	Lower	109	45.9
	Middle	89	37.5
	Hyearigher	39	16.4
Duration of Symptoms	≤1 Year	85	35.8
	≥1Year	152	64.1
BMI	≤ 25Kg/m^2	77	32.4
	≥25Kg/m^2	160	67.5
No. of Transfusions	≤2Transfusion	105	44.3
	≥2 transfusion	132	55.6

The mean duration of symptoms was found as 2.48 ± 1.76 years and regarding stratification < 1 year showed

85(35.8%) and > 1 year showed 152(64.1%) is given in table 01.The BMI was calculated as 27.3 ± 4.07 kg/m2 after stratification ≤25 kg/m2 showed 77(32.4%) and >25 kg/m2 seemed more frequencies 160(67.5%). The mean number of transfusions needed/ month was 1.24 ± 0.79 in this variable 105(44.3%) patients were observed 2 or less transfusion while 132(55.6%) were needed more than 2 transfusions. Table 1.

In this study, frequencies of Hepatitis B 31(13.8%) and Hepatitis C 73(30.8%) were observed among Thalassemia major patients. Stratification of outcome variables (hepatitis B and hepatitis C) was done for age, gender, socio-economic status, duration of symptoms, BMI, and no. of transfusion/month. All details are summarized in tables 2 and table 3.

Table No.2: Stratification of Hepatitis B with Different Variables

Stratification of Hepatitis B with different variabl				
Variable		Hepatitis b		P-value
		Yes	No	
Age of patients	2-6 years	22	133	0.484
	7-12 years	9	73	
Gender of patients	Male	25	115	0.008
	Female	6	91	
Socio-economic Status	Lower	18	91	0.351
	Middle	9	80	
	Higher	4	35	
Duration of Symptoms	≤1 Year	19	66	0.001
	≥1Year	12	140	
BMI	≤ 25Kg/m^2	18	59	0.001
	≥25Kg/m^2	13	147	
No. of Transfusions	≤2Transfusion	4	101	0.000
	≥2 transfusion	27	105	

Table No.3: Stratification of Hepatitis C with Different Variables

Stratification of Hepatitis C with different variables.				
Variable		**Hepatitis c**		**P-value**
		Yes	No	
Age of patients	2-6 years	46(29.68%)	109(70.32%)	0.606
	7-12 years	27(32.93%)	55(67.07%)	
Gender of patients	Male	51(36.43%)	89(63.57%)	0.024
	Female	22(22.68%)	75(77.32%)	
Socio-economic Status	Lower	39	70	0.245
	Middle	22	67	
	Higher	12	27	
Duration of Symptoms	≤1 Year	29	56	0.408
	≥1Year	44	108	
BMI	≤ 25Kg/m^2	21	56	0.414
	≥25Kg/m^2	52	108	
No. of Transfusions	≤2Transfusion	17	88	0.000
	≥2transfusion	56	76	

DISCUSSION

Globally beta-thalassemia is the most common genetic disorder that affects thousands of children. Worldwide, around 50,000-60,000 new cases of beta-thalassemia being born each year, while 80-90 million around the population are the carrier of beta-thalassemia.[13,17]

High prevalent of beta-thalassemia in the population of Asia, the Mediterranean countries, middle east, Africa, though in Pakistan high frequency of carrier around 5 to 7% of beta-thalassemia.

A total of 273 recorded patients from thalassemia, were screened for HBV and HCV infection. Regarding hepatitis B, it was found in 31 of 237 patients (13.08%) in this study, and hepatitis C was found in 73 of 237 patients (30.8%) respectively. All patients who were positive for hepatitis B were not vaccinated against the hepatitis B virus.

In the current study, a high prevalence rate of hepatitis B infection (13.08%) among thalassemia patients has seemed as compared to previous studies, was carried out to the same region 3.13% (0.66% to 7.4%).[14] A low prevalence of hepatitis B infections was observed as compared to HCV infection might be due to the availability of HB vaccine in the national EPI program, while still there is no vaccine available for hepatic C virus globally.

In our study, 31% of patients were positive for HCV. Globally, wide variation was observed in the prevalence of HCV in multi-transfused thalassemia patients in different regions, as seemed from the review of the literature. In Malaysian and Iranian patients, ranges from 5% to 63%.[15,16] While in a systematic review of Pakistani studies (2011-2019), observed HCV 26%(5.56% to 68.2%) among Beta-thalassemia major patients. The result is almost equal to our findings.[17]

Also, a study conducted in Pakistan by Ali (2016) reported that 32.6% of patients were positive for hepatitis C virus among thalassemia patients,[18] while another study recorded 27% of patients were positive for hepatitis C the results are almost comparable to our findings.[19] One Indian study showed that serotype antibodies against hepatitis C virus were 51 (24.6%) thalassemia patients.[20] In research meta-analysis, 27 studies were examined, the cumulative prevalence of HCV in thalassemia patients was 31.81% (95% CI: 20.27-44.59%) in Sindh, Pakistan.[21] In the current study, the number of men affected (27.95%)) was higher than that of women (17.51%), although the difference was not statistically significant (P>0,05). Our findings are consistent with previous report.[22,23]

Sociodemographic variables among thalassemic patients about the residence, language, economic status, and blood group seemed a random distribution of Hepatitis C virus with no statistical significance. This has seemed that the first study that highlights the sociodemographic aspects among thalassemic patients. However, efforts are required at the national or regional level to provide an accurate estimate.

Family history was summarized to explain the distribution of thalassemia and hepatitis concerning sporadic and familial representation and other family

attributes. The proportion of familial to sporadic thalassemia was 1: 1.7.[24] The average number of normal siblings was observed to be higher for family cases compared to sporadic ones. This may be because families with their first affected child are reluctant to have newborns. As noted, the prevalence of hepatitis was significantly higher in sporadic cases (55%) compared to family cases (18%).[25,26] This study also had some limitations. It was a unique study, so I recommend a multi-center study on the subject.

CONCLUSION

Hepatitis B and C are quite prevalent among patients with Thalassemia. It is quite an alarming situation having a lot of factors behind it, but it needs to be taken immediately. So I recommend proper screening of blood before transfusion to such patients and educational programs for these patients and their parents.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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