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ORIGINAL ARTICLE

Prevalence of Hepatitis B and C in Patients of Thalassemia in Sargodha, Pakistan

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ABSTRACT

Background: Thalassemia is one of the commonest genetic hematological disorders and a health issue of global concern. Because of repeated blood transfusions, ratio of hepatitis B and C positivity is escalating in these patients day by day who have further complicated the situation in the form of poor treatment outcomes and costs to individuals
Aim: To measure the prevalence of hepatitis B and C among patients of thalassemia major in Sargodha, Pakistan.
Study design: Cross-sectional study
Place and duration of study: Rai Hospital & Hilal-e-Ahmar Hospital, Sargodha from 01-01-20221 to 31-12- 2021.
Methodology: Three hundred and sixty thalassemia major patients, both beta and alpha, confirmed on hemoglobin electrophoresis admitted in the hospital were enrolled.
Results: The mean age of the participants was 10.24±2.5 years, and 50% were male and 50% females. About 34% of the patients had hepatitis in which 30% had hepatitis C and 1.1% hepatitis B. 2.2% had both.
Conclusion: Hepatitis b and C are highly prevalent among patients of thalassemia major. This also calls physicians, hematologists, pediatricians and policy makers to focus on counseling and support of thalassemia patients by providing them safe blood.
Keywords: Prevalence, Hepatitis B and C, Thalassemia major, Blood transfusion

INTRODUCTION

Globally thalassemia accounts for 1.5% of hematological disorders[1] and results in defective or absent adult hemoglobin[2]. It are an autosomal recessive disorder and most cases are familial[3]. For aerobic metabolism to continue in body for production of adequate adenosine triphosphate oxygen saturation must be in normal range. Oxygen carrying capacity of red blood cells is dependent on hemoglobin. As the name itself implies hemoglobin is made up of heme molecule with which 4 globin chains are attached. In thalassemia which is a single gene mutation disorder, synthesis of these globin chains is defective.

Adult hemoglobin is made up of 2 beta and 2 alpha globin chains. If both beta chains are defective or absent it is beta thalassemia major (homozygous) and if one is defective or absent it is beta thalassemia minor(heterozygous).In between the severity of these two lies thalassemia intermedia.[4]

Thalassemia major is transfusion dependent for whole life. It manifests itself after 06 months of birth when mother's hemoglobin fades away and child's own hemoglobin F (2 alpha, 2 gamma chains) takes its place .Thalassemia intermedia may or may not be transfusion dependent later in adult life. Thalassemia minor continues have normal life and rarely needs transfusion[1].

Clinical severity in alpha thalassemia is dependent on whether 1 chain is missing or both. Silent carriers and alpha thalassemia trait patients are asymptomatic. Hydrops fetalis variety dies shortly after birth or in utero. It's the hemoglobin H variety who is severely anemic and needs transfusion for whole life[3].

Blood transfusion in these patients is like two faces of a coin whose one side saves lives and keep the functions going on but on the other side it has devastating effects if goes unchecked[2,5]. One of the hazardous effects of transfusion is transmission of infectious diseases. In Southeast Asia, Mediterranean, Middle East and African regions most commonly hepatitis B and C are transmitted through blood transfusions. In developed countries HIV and syphilis are more common infections to be transmitted via transfusion (WHO).

These patients on one hand deal with the complications of the primary disease and on the other end they are burdened with diseases which impair their bodily functions further as hepatitis if not cleared from the system and become chronic can lead to liver cirrhosis[6]. There is no vaccine available for hepatitis C. And even if vaccination against hepatitis B is available, because of lack of knowledge on patients end and negligence on part of health care givers, few of these individuals are not vaccinated against hepatitis B. Antiviral therapy has its own side effects and is not well tolerated in these patients as well.

The rationale of this study is to highlight the prevalence and associated risk factors of catching hepatitis B and C among patients of thalassemia major in Sargodha, Pakistan which is alarmingly high and is costing high in terms of adverse treatment outcomes and weakening the already weak infrastructure further.

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MATERIALS AND METHODS

This cross-sectional study was carried out in Rai Hospital, a private-sector hospital and Hilal-e-Ahmar Hospital, Sargodha from 1st January 2021 to 31st December 2021. All patients between 06 months to 20 years of age, diagnosed cases of beta thalassemia (major and intermedia) and alpha thalassemia (on hemoglobin electrophoresis or high performance liquid chromatography) were included. All patients of thalassemia minor and thalassemia major or intermedia with comorbid were excluded. Sample size of 355 was calculated using Raosoft sample size calculator 2004 by Raosoft Inc. At Confidence interval 95% and margin of error 5% with response distribution of 36.2%.[2].To increase power of study and to compensate for missing and loss to follow up patients sample size is increased to 360 patients.

All patients meeting the inclusion criteria and admitted for blood transfusion or presenting in outpatient department were included after taking informed consent from the patients and guardians as pediatric patients. Demographic information including age, gender, frequency of blood transfusion, hepatitis B and C status, vaccination against hepatitis B and family history including parents and siblings suffering from thalassemia was obtained. Data was analyzed in SPSS-25. Data was stratified for age, gender.

RESULTS

There were 180(50%) males and rest 180 females (50%). Hepatitis C (Anti-HCV antibody) was positive in total 108(30%) patients, among which 56 were males (15.5%) and 52 were females

(14.5%) [Table 1]. Hepatitis B (HbsAg) was positive in 4 (1.1%) male patients (Table 2). Both Hepatitis B and C were positive in total 8(2.2%) patients and 4(1.1) of them were males and 4(1.1) females (Table 3). HIV (ELISA) was positive in 4(1.1%) male patients (Table 4).

Among patients who were positive for hepatitis or HIV, 80(64.5%) patients used to receive transfusion after 14 days, 40(32%) patients after a month and 4(3.2%) patients used to receive it on irregular intervals (Table 5). In contrast to these, among 236 negative patients, number of cases who received transfusion after 14 days were 40(16.9%), after a month 192(81.3%) and 4(1.69%) used to receive it on irregular intervals (Table 6).

Age ranges were identified as sample included patients of various age groups. Number of patients in which transfusion started before 1 year of age were 69(55.6%).In 12 (9.67%)cases transfusion started between 1-2 years and 4(3.2%) were more than 2 years of age Table 7. Among negative cases 112(47.4%) received their first transfusion before they got 1 year old, 36 (15.2%) cases received their first transfusion between 1-2 years of age and only 4(1.69%) had their first transfusion after 2 years of age Table 8. Mean age at the start of transfusion was 8 months. There was history of consanguineous marriage in 308 (85%) cases and 52 (14.4) were sporadic.

Table 1: Number of hepatitis C positive cases

Gender	Cases	Anti-HCV Ab +ve
Males	180	56
Females	180	52
Total	360	108

Table 2: Number of hepatitis B positive cases

Gender	Cases	HbsAg +ve
Males	180	4
Females	180	0
Total	360	4

Table 3: Number of Hepatitis B & C positive cases

Gender	Cases	Anti-HCV Ab & HbsAg +ve
Males	180	4
Females	180	4
Total	360	8

Table 4: Number of HIV positive cases

Gender	Cases	HIV Positive
Males	180	4
Females	180	0
Total	360	4

Table 5: Frequency of transfusion among positive cases

Frequency of transfusion	No.
Fortnightly	80
Monthly	40
Irregular	4

Table 6: Frequency of transfusion among negative cases

Frequency of transfusion	No.
Fortnightly	40
Monthly	192
Irregular	4

Table 7: Ages at the start of transfusion in positive cases

Age at the start of transfusion	No.
1-12 months	69
1.1-2 years	12
2.2-4 years	4

Table 8: Ages at the start of transfusion in negative cases

Age at the start of transfusion	No.
1-12 months	112
1.1-2 years	36
2.2-4 years	4

DISCUSSION

Survival of patients of thalassemia is dependent upon blood transfusion shortly after birth as the adult hemoglobin wanes off [7].But this life saving procedure has its own hazards. One of them is transmission of infectious diseases including hepatitis and HIV. This study was aimed to measure the prevalence and associated risk factors of catching hepatitis B and C among patients of thalassemia major. Among general Pakistani population prevalence of hepatitis C is 6.2% but in high risk population[15]. it is up to 34.5%[10]. In our study population prevalence of hepatitis was 30% and positivity was slightly higher in males than females. These results are consistent with studies done by Din et al[7] and Akhtar et al.[2] Also study done by Waheed et al[9] showed prevalence of 29.79% which in accordance with our results. Study done in Peshawar by Al-Moshary et al[11] showed prevalence of HCV at 23.66%, HBV 4.87% and HIV 1.39% and these figures are in conformity with our results. Another systematic review of literature done by Ehsan et al[8] support our results with prevalence for hepatitis C 26% and Hepatitis B 3.13% but for HIV is 0.5%. In contrast to this study our results for HIV stand at 2.2% which is very alarming. Hepatitis B was positive in 4 males only (1.1%) and these results are also in line with previous studies[2,4,5].

There were 8 patients in which both hepatitis B and C were present. HIV was also present in 4 male patients. Incidence of hepatitis B has reduced significantly since introduction of vaccination against hepatitis B in Expanded Programme on Immunization in 2001.In our study 99% of patients were vaccinated against hepatitis B and only 0.8% of them were unvaccinated. These findings are in accordance with the study by Mirzaei et al[4]. Hepatitis C positivity is highest as compared to hepatitis B or HIV. This may be because Anti-HCV antibodies are not detected in blood donors during window period[7,13].

In blood donors' seroprevalence for hepatitis B, C and HIV were 2.35%, 3.26% and 0.17%[14]. Although all patients of thalassemia major receiving blood transfusion are prone to acquire these infectious diseases but our study showed that the patients who receive transfusion frequently and in whom it started earlier are more liable to become positive than those in whom interval between transfusion is relatively increased to maintain haemoglobin[5].

Among 124 positive patients 80 patients were receiving transfusion every 2 weeks and 40 every month. In contrast to them among negative patients 40 were receiving transfusion 2 weekly and 192 on monthly basis. Transmission of hepatitis is prevalent in other parts of the world too. In Iran, Iraq, India, Bangladesh and Egypt its prevalence is 4.2%[15] and 8%[16], 20.49%[17], 24.6%[18] and 19.5%[19] respectively. In Iran prevalence of hepatitis B and C is much reduced as compared to rest of developing countries probably because of proper screening of blood and vaccination against hepatitis B[4].

In developed countries because of proper legislation and strong framework for implementation of transfusion related guidelines, transfusion acquired infections are just 2.5 per 1 million donations.[12] Though there are protocols for safe blood transfusion and blood screening for infectious diseases (introduced in may1990) is mandatory but there are still breaches in protocol. And in addition to increasing age, frequent and early blood transfusions other factors responsible for these infringements are poor socioeconomic status, consanguineous marriages, lack of knowledge, lack of resources and governmental support. Family marriages are common in Pakistan and this is a significant risk factor for developing thalassemia major.[21] Among total 360 cases, there was history of consanguineous marriage in 308(85.5%) cases while 52 (14.4%) were sporadic. In these families there were multiple cases of thalassemia but only 25% were aware of genetic mode of counselling. When inquired about the knowledge of the disease course, its complications and complications of transfusion then just 50% of the patients and families were aware of the natural course of disease, perils of repeated transfusion and

importance of chelation therapy. Though this frequency is much higher than the one depicted (15.8%) in study done by Ehsan et al[8]

Around 62% of population in Pakistan is living in remote areas where basic health care facilities are lacking and there is no surveillance system for blood transfusion. Owing to lack of knowledge of primary disease and unacquainted of the perils of transfusion ,needy people used to get blood either through non-governmental organizations or private blood donor bodies which usually do not liaise with standard transfusion guidelines and most of the time they are not even licensed for providing these services. Substandard donor selection and faulty laboratory testing jeopardizes patient safety and contributes in further deteriorating the fragile health of already compromised and weak immune system of thalassemia patients in the form chronic hepatitis and cirrhosis[6].

Fragile immunity because of the complications of the disease itself like chronic hemolytic anemia, splenic resection, skeletal changes due to extra medullary hematopoiesis, iron overload secondary to repeated transfusions leading to secondary hemochromatosis, cardiomyopathy or spinal cord compression[20], should not be burdened further in the form of these transmissible infectious disorders.

CONCLUSION

Hepatitis B and C are highly prevalent among patients with thalassemia major. The irony is that most of them are unaware that the transfusion they are receiving to improve their quality of life is actually making their lives worse by causing them to contract hepatitis during the normal treatment course for thalassemia major or intermediate. Now is the time to ensure that blood products are properly screened for all diseases that have the potential to be transmitted through blood transfusion, particularly hepatitis B and C and HIV. Blood transfusion services at all levels should operate under national control guidelines, a seamless blood screening system should be in place, and quality assurance in blood banks throughout the country should be assured by transfusion regulation bodies. Thalassemia centres should be established as approximately 1/3 of the annual blood collected and transfused is consumed by these patients. There is a need to reduce this burden by educating the patient about the course of the disease and the long-term complications of transfusions. This also calls on physicians, hematologists, and paediatricians to focus on genetic counselling and make people aware of the genetic mode of transmission of this crippling disorder. Policymakers should extend their support to thalassemia patients by forming national testing strategies for blood screening and providing them with safe blood.

Conflict of interest: Nil

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