STUDENT ARTICLE

Endocrine Complications Among Multi-Transfused Thalassemia Patients

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ABSTRACT

Objective: To determine the endocrine complications in multi-transfused thalassemia patients attending outpatient department (OPD) of Hussaini blood bank, Karachi, Pakistan.

Methodology: A cross-sectional study was conducted in Thalassemia Centre of Husaini blood bank, Karachi from September 2017 to December 2017. A pre-structured questionnaire was used to collect the information regarding the complications like visual, dental, renal, and hearing problems, dryness, muscles fatigue, shiny skin, polydipsia, polyuria, polyphagia, weight loss, and frequent infections.

Results: A total of 40 thalassemia patients were included in the study. The most common endocrine complication was muscle fatigue (n=29, 72.5%) followed by weight loss (n=23, 57.5%), polydipsia (n= 22, 55%), frequent infection (n=19, 47.5%), polyphagia (n=18, 45%) and polyuria (n= 18, 45%). There were 20 non-diabetic and 20 diabetic patients. A significantly higher association of diabetes was observed with age (p-value 0.002), weight (p-value 0.005), and FBS level (p-value 0.003) whereas complications like polydipsia (p-value 0.011), polyurea (p-value <0.001), and weight loss (p-value 0.004) were also found significantly higher among multi-transfused patients with diabetes as compared to the multi-transfused patients without diabetes.

Conclusion: The finding of this study showed that muscle fatigue, weight loss, and polydipsia were most common endocrine complication. However, when compared according to the diabetes status, polydipsia, polyurea, and weight loss were significant complications in multi-transfused patients with diabetes.

Key words: Endocrine complications, diabetes mellitus, Multi-transfused thalassemia patients, Pakistan.

How to cite this article: Zehra F, Fatima S, Mustafa B, Fatima M, Jafri SS, Baig N. Endocrine complications among multi transfused thalassemia patients. J Dow Uni Health Sci 2018; 12 (3): 124-128.

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INTRODUCTION

Thalassemia is a genetic disorder which causes severe anemia, growth retardation, skeletal disturbances, and iron overload, cardiac and endocrine abnormalities which cut short the life of the affected individuals.[1] Studies reported that approximately 70000 infants per year are born with β-thalassemia globally.[2]

The most common type of thalassemia is β-thalassemia.[3,4] The genetic heterogeneity of β-thalassemia results in a wide spectrum of clinical phenotypes that may vary from mild chronic hemolysis to a severe transfusion-

dependent hemolytic anemia.[5] According to a study, β-thalassemia is the most common autosomal hereditary disease and at least 200,000 patients (homozygote) and 240 million carrier of thalassemia genes (heterozygote) are born worldwide each year.[6] The patients of this disease require lifelong treatments such as blood transfusion, iron chelating agents, medicines such as folic acid, calcium and vitamin K and various other medicines depending on the condition of the patient.

Although, transfusions are the primary therapies for thalassemia but have significant risks including hemosiderosis, transfusion reactions, alloimmunization, and infections.[7] The rationale of this study is that as transfusion therapy is common among patients with multi-transfused thalassemia, it is important to understand the complications that can arise as a result of blood transfusion. We conducted this study with the to identify the most common endocrine complications (diabetes mellitus) in multi transfused thalassemia patients. Furthermore, to compare the sociodemographic data, clinical findings and other diabetic complication among diabetic and non-diabetic multi-transfused thalassemia patients.

METHODS

A descriptive cross-sectional study was conducted in Thalassemia Center of Hussaini Blood Bank, Karachi, Pakistan from September to December 2017. All data were collected prospectively from patient's interview, blood banking records and laboratory testing. The inclusion criteria were multi-transfused thalassemia patients irrespective of age, gender and duration.

A pre-structured questionnaire was used to collect the information regarding the socio demographic characteristics like age, gender, ethnicity, and clinical characteristics like first blood transfusion age, iron chelation therapy, smoking, family history of diabetes, clinical findings (FBS, serum urea creatinine, urine DR, ferritin level and HB) and complications like visual, dental, renal, and hearing problems, dryness, muscles fatigue, shiny skin, polydipsia, polyuria, polyphagia, weight loss, and frequent infections were evaluated.

Ethical approval was obtained from Hussaini blood Bank. Furthermore, a signed informed consent was also obtained from the patient/guardians after explaining the pros and cons of the study.

Statistical analysis for Social Sciences (SPSS version 22) was used for the purpose of statistical analysis. The descriptive analysis was explored using median and interquartile range (IQR) for quantitative variables whereas frequency and percentages were calculated for qualitative variables. The comparison was done to see the effect of the presence of diabetes on various demographics, clinical characteristics and endocrine complications. Chi-square test and Mann-whitney U test was applied. P-value <0.05 was taken as significant.

RESULT

Out of total of 40 patients, the median age was 20 (18-24) years (males 37.5% vs. females 62.5%). The ethnic origin of majority of the patients was Balochi (n=17, 42.5%), Sindhi (n=11, 27.5%), Pathan (n=6, 15%), Balochi (n=17, 42.5%) Punjabi (n=6, 15%). Thalassemia major were predominantly higher (n=39, 97.5%) as compared to intermedia (n=1, 2.5%). Consanguineous marriages were observed in 22 (53.5%) patients.

The median age at the first transfusion was 6 (3-6) months. The median age of onset of diabetes was 21 (range 10 - 40) years of age.

The findings of medications relating to diabetes and reducing complications showed that 19 (47.5%) patients were having medications through parenteral route and 21 (52.5%) patients were having through oral and parenteral both.

The laboratory parameters showed that median Hb level, ferritin level, FBS, urea, and creatinine were 8.6 (8.1-9.1) g/dl, 6500 (5000-9050) ng/mL, 96 (89-137) mg/dl, 22 (18-27) mg/dl and 0.50 (0.40-0.50) mg/dl

respectively. Frequency of complications showed that muscle fatigue was found higher 29 (72.5%), weight loss (n=25, 62.5%) polydipsia (n=23, 57.5%) followed by, frequent infection (n=19, 47.5%), polyphagia (n=18, 44.5%) and polyuria (n=15, 37.5%).

There were 20 non-diabetic and 20 diabetic patients. The comparison of diabetic status with demographic and clinical characteristics of the children showed that age (p-value 0.002), weight (p-value 0.005), and FBS level (p-value 0.003) were significantly higher among multi-transfused patients with diabetes as compared to the multi-transfused patients without diabetes. Moreover, complications like polydipsia (p-value 0.011), polyurea (p-value <0.001), and weight loss (p-value 0.004) were also found significantly higher among multi-transfused patients with diabetes as compared to the multi-transfused patients without diabetes. However, ethnicity (p-value 0.443), gender (p-value 0.744), first transfusion (p-value 0.795), hemoglobin level (p-value 0.947), Ferritin level (p-value 0.06), Urea (p-value 0.398), Creatinine (p-value 0.157), family history of diabetes (p-value 0.527), iron chelation therapy (p-value 0.342), dental problem (p-value 0.429), renal problem (p-value 0.548), polyphagia (p-value 0.110), muscle fatigue (p-value 0.465), and frequent infection (p-value 0.342) were found to be insignificant. (Table 1)

Table 1: Comparison of diabetic status with demographic and clinical characteristics of the children (n=40)

Variables	Diabetes Status		
	Diabetes (n=20)	Non-diabetes (n=20)	p-value
	median (IQR)	median (IQR)	
Age, years	21 (18-25)	18 (16-20)	0.002†
Weight, Kg	41 (38-46)	37 (32-39)	0.005†
FBS	133 (91-177)	92 (88-101)	0.003†
	n (%)	**n (%)**	
Polydipsia			
Yes	15 (68.2)	7 (31.8)	0.011‡
No	5 (27.8)	13 (72.2)	
Polyurea			
Yes	14 (77.8)	4 (22.2)	<0.001‡
No	6 (27.3)	16 (72.7)	
Weight Loss			
Yes	16 (69.6)	7 (30.4)	0.004‡
No	4 (23.5)	13 (76.5)	

- †Mann-whitney U test applied, ‡Chi-square test applied.
- The table showing comparison of variables having significant findings only

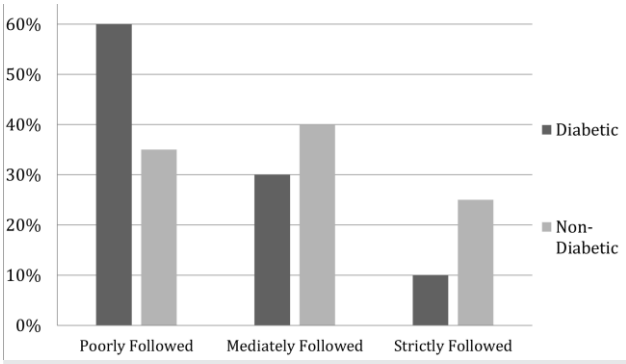

Figure 1: Compliance of iron chelation therapy in multi-transfused patients with and without diabetes (n=40)

The iron chelation therapy was recommended to all the patients. However, strict compliance with the iron chelation therapy was observed among no-diabetic patients as compared to those who had diabetes. (Figure 1)

DISCUSSION

This study was conducted in a thalassemia centre of a private sector blood bank of Karachi with the aim to investigate the most common endocrine complications (diabetes mellitus) in multi transfused thalassemia patients. In addition to this, we also compared the sociodemographic data, clinical findings and other diabetic complication among diabetic and non-diabetic multi-transfused thalassemia patients. The results of our study are consistent with previous literature which suggests that thalassemia patients following poor iron chelation therapy are most likely to suffer from diabetes mellitus.[8,9]

The rate of diabetic complications in our thalassemia centre patients includes high muscles fatigue, weight loss and polydipsia. Various studies reported that as the life expectancy of patients with thalassemia rises, this will also increase many more years of hyperglycemia and diabetes.[10-12]

In this study, a significantly higher association

of diabetes was observed with age, weight, and FBS level whereas complications like polydipsia, polyurea, and weight loss were also found significantly higher among multi-transfused patients with diabetes as compared to the multi-transfused patients without diabetes.

Though in our study, ferritin level was found to be high but it was statistically insignificant in between diabetes group. In a study, younger age patients showed high serum ferritin levels. They found that average serum ferritin increases as age increases.[13] Similarly, in another study ferritin level is higher than the normal recommended levels for normal individuals.[14]

Patients in the thalassemia center of Hussaini blood bank were being actively and medically managed by the significant use of diabetic therapy (100%), oral and parenteral (52.5%) and only parenteral (47.5%). Moreover, in our experience, we experienced two diabetic thalassemia patients who were suffering from somogyi effect with sudden rise and sudden fall in sugar level. A study reported that the prevalence of diabetes mellitus in thalassemia has been shown to correlate with serum ferritin concentration, hepatitis C infection, and pancreatic and cardiac iron measured by imaging techniques.[15]

The finding of the study could be observed in the light of limitation that the sample size of the study was small. Large scale multi-center studies are recommended to validate the findings of the study.

CONCLUSION

The finding of this study showed that muscle fatigue, weight loss, and polydipsia were most common endocrine complication. However, when compared according to the diabetes status, polydipsia, polyurea, and weight loss were significant complications in multi-transfused patients with diabetes.

Acknowledgment: We would like to acknowledge doctors and staff of Hussaini Blood Bank for their cooperation in our research project. And the thalassemia patients for their consent to participate in this study. Moreover, we would also like to acknowledge our teacher Sir Omair Adil for his guidance and support in this project.

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