International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

A Study of 100 Cases of Clinical Profile of Thalassemia Major Patients and Special Emphasis on Iron Chelation and Diastolic Dysfunction

Dr. Kalpesh J Chaudhary[1], Dr. Meghavi S Bhapal[2]

[1]Senior Resident, PDU Medical College, Rajkot, India

[2]Assistant Professor, PDU Medical College, Rajkot, India

Abstract: ***The present study consisted of 100 patients of thalassemia major who were in regular follow up in thalassemia ward at PDU Civil Hospital, Rajkot during the period of Sept 2019 to Oct 2020.They were evaluated clinically and laboratory investigated and ultrasound of abdomen & echocardiogram was done. Among them various clinical presentation like poor growth, fatigue, abdominal distention, jaundice, fracture, pedal edema, breathlessness were noted due to chronic hemolysis, extramedullary ineffective erythropoiesis, marrow expansion, platelet dysfunction, iron deposition in various organs & glands due to blood transfusion, in which cardiac complications are the major cause of morbidity and mortality among them.***

Keywords: thalassemia, iron chelation, diastolic dysfunction.

1. Introduction

Beta-thalassemias are a group of hereditary blood disorders characterized by absence or reduction in the synthesis of the beta chains of hemoglobin. The resultant phenotype varies grossly ranging from clinically asymptomatic individuals to those with severe anemia. The average life expectancy of transfusion dependent beta thalassemics have increased to third and the fourth decades over the past ten years. Moreover the qualities of these transfusion dependent children have been transformed due to better health care facilities.

Nevertheless, the several complications of the disease have been disclosed as there is prolongation of life the complications may be partly due to the underlying disorder and is partly related to the conventional treatment with blood transfusions and subsequent iron overload.

In some of the developing countries individuals with thalassemia major are either untreated or transfused inadequately. Persistent severe anemia leads on to various consequences in these patients. The common findings in such underprivileged children include growth retardation, pallor, jaundice, poor musculature, hepatosplenomegaly, leg ulcers, and development of masses from extramedullary hematopoiesis, and skeletal changes that result from expansion of the bone marrow.

On the other hand, complications due to iron overload contribute to the major issues in those patients receiving regular transfusion. The iron overload leads to serious complications including endocrine complication (growth retardation, , diabetes mellitus, and insufficiency of the parathyroid, thyroid, pituitary, failure of sexual maturation and less commonly, adrenal glands), liver fibrosis and cirrhosis, dilated cardiomyopathy, Diastolic dysfunction.

Long term packed cell transfusion therapy leads on to iron overload which is almost an inevitable and deadly complication. Iron overload can lead on to early death mainly from excess iron induced cardiac disease. This has to be prevented by prompt and adequate treatments with removal of excess iron from the body i.e. iron chelation.

Aims and Objectives

1) To Notice various clinical presentations of thalassemia major patients.
2) To study association of iron chelation and cardiac complication.

2. Materials and Methods

The study is retrospective, observational conducted in patients of thalassemia attending at Thalassemia ward and Medicine department of PDU Medical College, Rajkot. All patients were thoroughly examined, Medical history taken with specific emphasis to patients and treatment history, Previous medical records were retrieved and analyzed, complete clinical examination was done.

Blood samples were collected for relevant investigations including blood grouping & typing, complete hemogram, iron studies, hemoglobin electrophoresis, blood sugar, bl.urea, s.creatinine, liver function tests, s.calcium, thyroid profile, viral markers for hepatitis, ELIZA for HIV.

Radiological investigations including x rays chest, ultrasound abdomen, electrocardiogram, echocardiogram were done.

Inclusion Criteria

- Patients of thalassemia, age >12 years and both gender
- Both Indoor and Outpatients taking treatment at Thalassemia ward and Medicine Department PDU Medical College, Rajkot.

Exclusion Criteria

- Pregnant Females

- Patient having other hemoglobinopathies.

Period of Study
September 2019 to October 2020.

3. Observations

Distribution of patients according to their age at diagnosis

Age at Diagnosis (Months)	Number of Patients
0-12	64
13-24	19
25-36	3
37-48	4
49-60	7
>60	3
TOTAL	100

Systemic involvement in patients included in current study

Systems Involved	Number of Patients Affected
Hepatobilliary	75
Cardiovascular	39
Endocrine	20
Bone Metabolism	66
Central Nervous	8
Infection	4

Hemoglobin Levels in Patients of Present Study

Hemoglobin Level (gm/dl)	No. of Patients (N=100)
<7	17
7-10	76
>10	7

Sugar Levels in Thalassemia Patients

Sugar Level	No. of Patients
Normal	83
Abnormal	17

Thyroid functions test in thalassemia patients

TSH Levels (mIU/L)	No. of Patients
Normal	84
Abnormal	16

Liver function test in thalassemia patients

No. of Patients (N=100)	Normal	Abnormal
Bilirubin	55	45
Sgpt	47	53

USG findings in thalassemia patients

USG Findings	Present	Absent
Hepatomegaly	86	14
Splenomegaly	59	09
Gallblader Stone	10	90

(Among total 100 patients, 32 patients were splenectomised)

Calcium levels in thalassemia patients

Calcium Levels (mg/dl)	No. of Patients (N=100)
Normal	83
Abnormal	17

Bone scan findings in thalassemia patients

Bone Scan Findings	No. of Patients (N=100)
Osteopenia	17
Osteoporosis	58
Not available	25

Distribution of patients according to age and prevalence of diastolic dysfunction among them

Age of patient	No. of patients	Diastolic dysfunction
13 -18	46	3
19-24	38	28
25-30	16	14

Distribution of patients according to ferittin level and prevalence of diastolic dysfunction among them

Level of ferittin	No. Of patients	Diastolic dysfunction
<2000	19	4
2000-5000	48	15
>5000	33	26

Patients on iron chelaters and its association with diastolic dysfunction

Iron Chelators	Diastolic Dysfunction		Total
	Yes	No	
Yes	29	43	72
No	16	12	28
Total	45	55	100

4. Discussion

Among 100 patients we studied, majority (64%) of patients were diagnosed before 12 month of age, 19% were diagnosed in their age between 1-2 year, and even few (3%) also diagnosed after age of 5 year. Hepatic dysfunction were noted in 75% of patients (in terms of jaundice, altered liver function test and usg findings), 45% (~1/2) of patients had cardiac complication, which had significant impact on daily living of thalassemic patients, 20% were suffered from endocrinopathy (altered blood sugar, thyroid profile), 66% of patients had bony abnormality (history of fracture, dexa scan s/o osteopenia, osteoporosis), 8% had neurological menifestations (h/o altered sensorium, seizure), 4% had blood transfusion related infections.

17% of the patients were under transfused are severely anemic having Hb <7gm%, majority (76%) were having Hb 7-10gm%, rest 7% having Hb>10gm%. abnormal blood sugar level found in 17% of patients while 16% having deranged thyroid profile.

Among 100 patients 45 had deranged bilirubin levels and 53 had deranged seum sgpt level. On ultrasound screening 86% had hepatomegaly (including mild also), 32 patients were splenectomised in 68 patients splenectomy was not done 59 (89%) showing splenomegaly, while 10 patients also had GB stone.

Low serum calcium level seen in 17% of patients. Out of 100, 75 patients Bone dexa scan done recently, in which 58 were had osteoporosis and 17 had osteopenia.

Prevalance of Diastolic dysfunction only 7% in age group 13-18, while it was 74% in age of 19-24 and 88% in age group of 25-30. Patients who had ferritin level <2000 only 21% were having diastolic dysfunction, while ferritin of 2000-5000, 31% had diastolic dysfunction and 78% of patients having diastolic dysfunction are fall under category who had ferritin level >5000ng/ml.72 were on iron chelator,

among them 40% were developed diastolic dysfunction, and 28 who were not on any kind of iron chelator having 57% patients who had diastolic dysfunction.

Iron overload is the main problem encountered in the management of thalassemia. As there are no effective mechanisms for excretion of iron from the body, the use of iron chelators is the only way for the removal of excess iron. The use of iron chelators is mainly aimed at reducing the iron stores in the body and to maintain the iron store in the body at low levels.

5. Summary & Conclusion

This study aimed at various clinical presentation, their treatment and complications with more emphasis on cardiac complication and its association in adult age group of 100 thalassemia patients of PDU medical college, Rajkot.

Majority (64%) of patients were diagnosed before 12 month of age. Major systemic involvement in them are 1) Hepatobilliary complications 75% > (2) bone metabolism 66% > (3) cardiac comlications 45% > (4) endocrinoppthies 20%. 17% of the patients were under transfused are severely anaemic having Hb <7gm%, are the group of patients in which various systemic complications are more prevalent and having poor quality of life, while majority (76%) were maintaining Hb 7-10gm% with regular blood transfusion having better clinical profile.

Hepatomegaly was seen in 86% of the patients. Patients who had devloped moderate to severe splenomegaly, abdominal distention, severe abdominal pain increased blood transfusion requirement are undergone splenectomy are better clinically in terms of symptoms and less Blood transfusion requirement.

Prevalence of Diastolic dysfunction were 88% in age group of 25-30 suggest that as the as the age advances due to more number of blood transfusion, iron deposition in myocardium leads to restrictive cardiomyopathy and eventually diastolic dysfunction occur which is having major impact on quality of life as morbidity and mortality both increases with the involvement of cardiovascular system. Among 33 of patients who had serum ferritin level >5000, 26 (78%) had diastolic dysfunction suggest that as the iron overload in organs like myocardium in terms of diastolic dysfunction correlates with iron overload in blood level e.g., increase ferritin level. Iron chelation by means of oral/I.v agents had significant impact on health of thalassemic patients evidenced by less prevalence of diastolic dysfunction among them, 40% (on iron chelators) v/s 57% (Nonchelators).

References

[1] Harrison's principle of internal medicine 20th edition
[2] Hematology Basic principle and practice 4th edition by HOFFMAN R.
[3] Wintrobe's clinical hematology 14th edition
[4] Hershko, C. & Weatherall, D.J. (1988) Iron-chelating therapy. CRC Clin. Rev. Clin.Lab. Sci. 26, 303.
[5] Piga A, Gaglioti C, Fogliacco E, Tricta F: Comparative effects of deferiprone and deferoxamine on survival and cardiac disease in patients with thalassemia major: a retrospective analysis. Haematologica 2003, 88:489-496.
[6] Ceci A, Baiardi P, Catapano M, Felisi M, Cianciulli P, De Sanctis V, DelVecchio GC, Magnano C, Meo A, Maggio A: Risk factors for death in patients with beta-thalassemia major: results of a case-control study. Haematologica 2006, 91:1420-1421.
[7] Farmaki K, Tzoumari I, Pappa C, Chouliaras G, Berdoukas V: Normalisation of total body iron load with very intensive combined chelation reverses cardiac and endocrine complications of thalassaemia major. Br J Haematol 2010, 148:466-475.
[8] Cavill, I., Ricketts, C., Jacobs, A. & Letsky, E. (1978) Erythropoiesis and the effect of transfusion in homozygous beta-thalassemia. N.Eng. J. Med. 298, 776.