International Journal of Clinical and Diagnostic Pathology

ISSN (P): 2617-7226
ISSN (E): 2617-7234
www.patholjournal.com
2021; 4(2): 91-94
Received: 05-12-2019
Accepted: 01-01-2020

Dr. V Swetha
Assistant Professor, Department of Pathology, Fathima Institute of Medical Sciences, Kadapa, Andhra Pradesh, India

Dr. MA Mujeeb Siddiqui
Assistant Professor, Department of Pathology, Fathima Institute of Medical Sciences, Kadapa, Andhra Pradesh, India

Corresponding Author:
Dr. MA Mujeeb Siddiqui
Assistant Professor, Department of Pathology, Fathima Institute of Medical Sciences, Kadapa, Andhra Pradesh, India

Analysis of haemolytic anemia's clinicohematological profile in tertiary care hospital

Dr. V Swetha and Dr. MA Mujeeb Siddiqui

DOI: https://doi.org/10.33545/pathol.2021.v4.i2b.365

Abstract
Introduction: The destruction of the red cell membrane causes hemolytic anemia, which can be affected by a variety of underlying pathologies. Membrane mutations, enzyme defects, hemoglobinopathies, immune destruction, and non-immune destruction are also possible causes. Hemolytic anemia can be easily diagnosed using specific laboratory procedures.
Aims and Objectives: The aim of this research was to look at the clinicopathological profile of hemolytic anemia in a tertiary care hospital.
Materials and Methods: A total of 70 cases were collected in a pathology department in south India. The research covered all recently diagnosed patients as well as old cases that had been followed up on.
Results: Beta thalassemia trait was found to be the most common, with 40% of people having it, followed by sickle cell anemia (20%), malaria (14%), beta thalassemia major (11%), beta thalassemia intermedia (4.3%), sickle beta thalassemia (2.8%), sickle cell trait (1.4%), autoimmune hemolytic anemia (1.4%), and G6PD deficiency (1.4%). Hereditary spherocytosis and HbD Punjab both had one case. The analysis found a male preponderance. Microcytic hypochromic red blood cells with varying degrees of poikilocytosis and anisocytosis were the most common peripheral smear findings. Jaundice is the most frequent clinical manifestation, accompanied by splenomegaly, hepatomegaly, thalassemia facies, gall stones, hemolytic facies, growth retardation, and edema,
Conclusion: In hemolytic anemia, hemoglobin electrophoresis is still the method of use. Hemoglobinopathies cause significant health issues in the Indian population, resulting in high morbidity and mortality. It's important to stress the importance of diagnosing hemolytic anemia so that a clear course of action can be devised for diagnostic, prevention, and treatment interventions to avoid severe complications.

Keywords: Hemolytic anaemia, thalassemia, clinicohematological profile

Introduction
The breakdown of the red cell membrane causes hemoglobin secretion, resulting in hemolytic anemia. The breakdown of red blood cells is rare, and it may be extravascular or intravascular Membrane deficiencies (e.g. inherited spherocytosis), enzyme defects (G6PD deficiency), hemoglobinopathies (Sickle cell disorder or beta thalassemia), immune destruction (Autoimmune haemolytic anemia), and non-immune destruction (non-immune haemolytic anemia) are both causes [1-2].
In India, they cause a high level of morbidity, mild to extreme hemolytic anemia in people of all ages, and many deaths. 4.5 percent of the world's population is affected by hemoglobinopathies [3], The prevalence of beta thalassemia trait varies between 3-17% because of consanguinity and other causes [4]. Every year, ten thousand children with beta thalassemia major are born in India, accounting for 10% of all beta thalassemia major cases worldwide. The only form of treatment available are regular transfusions, iron chelation therapy in an attempt to prevent iron overload. In certain cases, bone marrow transplantation may be beneficial. The aim of this research is to determine the clinicohematological profile of hemolytic anemia in 100 patients at a tertiary care hospital.

Materials and Methods
A total of 100 cases were obtained in a pathology department in south India for this research. This research took into account both recently diagnosed and previously diagnosed cases. Both patients with hemolysis and a significant history were included in the study. Hemoglobin estimate, peripheral blood smear analysis, reticulocyte count, serum bilirubin,

And serum ferritin were among the routine tests performed. Sickling test, osmotic fragility, G6PD screening test, Direct Coomb's test, and HPLC were all investigated further. Organomegaly, gall stones, and other abnormalities were detected using abdominal ultrasonography. For the Crew Cut look, an X-ray of the skull was taken. A malaria rapid diagnostic test was also performed. CT scan, hepatitis markers, antinuclear antibody, and other secondary investigations were also considered. Hepatomegaly, splenomegaly, hemolytic facies, jaundice, anthropometric proportions, history of blood transfusions, and consanguinity were all noted during the physical test.

Results

The research contained a total of 70 cases of hemolytic anemia. The majority of the incidents were between the ages of 0 and 15, with a male preponderance (55 percent) Thalassemia major (5.3 gm/dl) had the lowest mean hemoglobin, followed by Autoimmune Hemolytic Anaemia (6.9gm/dl), Thalassemia Intermedia (7gm/dl), and sickle cell syndrome (9.1gm/dl) had the highest mean hemoglobin. The most frequent result was jaundice (56%) accompanied by splenomegaly (48%), hepatomegaly (35%), gall stones (16%), and development retardation (16%). 13% Only AIHA was found to be positive in a direct Coomb's Test.

Table 1: Prevalence of hemolytic anaemia in the present study

Type of Anaemia	No. of Cases	Percentages
Beta thalassemia trait	28	40
Sickle cell anaemia	14	20
Beta thalassemia major	8	11.4
Beta thalassemia intermedia	3	4.3
Sickle beta thalassemia	2	2.8
Sickle cell trait	1	1.4
Autoimmune hemolytic anaemia	1	1.4
Malaria	10	14.3
G6PD deficiency	1	1.4
Hereditary Spherocytosis	1	1.4
Hb D Punjab	1	1.4

In the current research, beta thalassemia phenotype was the most frequent hemolytic anemia, accompanied by sickle cell anemia, malaria, beta thalassemia major, beta thalassemia intermedia, sickle beta thalassemia, two cases each of sickle cell trait, AIHA, and G6PD deficiency, and one case each of Hereditary spherocytosis and Hb D Punjab.

Table 2: Hematological profile in the study

Diagnosis	Hb (gm/dl)	S. Ferritin (ng/dl)	Total S. bilirubin (mg/dl)	Reticulocyte count
Beta thalassemia trait	7.3	575	1.8	3.2
Sickle cell anaemia	8.3	1380	3.0	4.1
Beta thalassemia major	5.3	1823	3.7	7.3
Beta thalassemia intermedia	6.4	201	2.7	3.6
Sickle beta thalassemia	7.1	215	3.2	3.3
Sickle cell trait	9.2	284	1.8	2.9
Autoimmune hemolytic anaemia	6.9	705	2.3	5.2
Malaria	7.8	1113	2.9	6.2
G6PD deficiency	7.7	137	3.5	4.3
Hereditary Spherocytosis	6.7	195	2.8	3.2
Hb D Punjab	1.0	190	2.6	3.8

In table 2, beta thalassemia major had the lowest mean hemoglobin, followed by beta thalassemia intermedia, Hereditary spherocytosis, AIHA, Hb D Punjab, and Sickle cell syndrome had the highest mean hemoglobin. 55 cases had hemoglobin levels ranging from 5-8gm/dl, 19 cases had hemoglobin levels less than 5gm/dl, and 4 cases had hemoglobin levels greater than 8gm/dl. The respective means of serum ferritin and serum bilirubin values were determined using the available biochemical parameters. Beta thalassemia major (1823 ng/dl) has the largest mean of S. ferritin in the sample, followed by sickle cell anemia (1380ng/dl) and malaria (1113ng/dl). Beta thalassemia major (3.7mg/dl) has the largest total serum bilirubin, followed by G6PD deficiency (3.5mg/dl) and sickle beta thalassemia (3.2mg/dl). Sickle cell disorder has the highest HbS values, followed by sickle thalassemia and sickle trait, in the available HbS and HbF values. In thalassemia major, fetalhemoglobin levels were found to be higher, followed by thalassemia intermedia and sickle thalassemia.

Table 3: Distribution of hemolytic anaemia according to sociodemographic variables

Diagnosis	Sex		Age group			
	Male	Female	0-15 years	16-30 years	31-45 years	46-60 years
Beta thalassemia trait	18	10	22	6		
Sickle cell anaemia	5	9	3	10		1
Beta thalassemia major	5	3	6	2		
Beta thalassemia intermedia	2	1	1	2		
Sickle beta thalassemia	1	1		2		
Sickle cell trait	1	0			1	
Autoimmune hemolytic anaemia	1		2			
Malaria	6	4		8	2	
G6PD deficiency	1		1			
Hereditary Spherocytosis	1		1			
Hb D Punjab	1			1		

Table 3 shows that the sample has a male preponderance, with a male to female ratio of 1.5:1. A total of 36 cases were found in the 0-15 years age group, 31 cases in the 16-30 years age group, 3 cases in the 31-45 years age group, and 1 case in the 46-60 years age group. In thalassemia major, 4 cases had a positive family history, 1 in sickle cell anemia, and 1 in inherited spherocytosis. History in siblings with similar complaints was noted in 6 cases. There was history

of consanguinity in 6 cases in the present study.

Table 4: Clinical profile of hemolytic anaemia patients (n=100)

Clinical profile	No. of cases presenting the condition
Growth retardation	6
Jaundice	45
Hepatomegaly	29
Splenomegaly	34
Hemolytic Facies	11
Edema	3
Gall stones	10
Thalassemic facies	22

Jaundice is the most frequent clinical manifestation, accompanied by splenomegaly, hepatomegaly, thalassemic facies, gall stones, hemolytic facies, growth retardation, and edema, according to table 4. In nearly all forms of thalassemia major, sickle beta thalassemia, and genetic sphercytosis, splenomegaly is present. In 34 of the cases, there was a lot of splenomegaly. In this study, 11 cases of hemolytic facies were found. 3 cases of thalassemia major were shown to have a 'crew cut appearance' on X-ray. In this research, there was no evidence of splenectomy or mortality due to hemolytic anemia complications.

Discussion

In the Indian subcontinent, hemolytic anemia is not evenly distributed. Gujarat has the highest prevalence of beta thalassemia trait at 10-15%, followed by Sindhis at 10% and Punjab at 6.5 percent. Orissa (9%), Assam (8.8%), Madhya Pradesh (7.4%), and Uttar Pradesh (7.1%) have the highest prevalence of Sickle Cell Disease. In India, the overall prevalence of thalassemia phenotype and sickle cell disease is 3-17 percent and 1-44 percent, respectively [5, 6].

Beta thalassemia trait was found to be the most prevalent hemolytic anemia in the current analysis, accounting for 40%, followed by sickle cell anemia (20%), and beta thalassemia major (11%), which is close to the findings of Venkateshwary *et al*. [7] who found that thalassemia trait accounted for 28.26 percent, thalassemia major 16.45 percent, and sickle cell anemia 5.6 percent. Similar findings were seen in the Ambekar SS *et al*. [3] study, with beta thalassemia phenotype being the most common. According to Shivashankara *et al*. [8] beta thalassemia major was the most frequent congenital hemolytic anemia, followed by thalassemia trait, sickle cell trait, and sickle cell thalassemia. Preeti *et al*. [9] conducted another study and Similar results were reported by Anusha *et al* [10], who found that beta thalassemia major was the most frequent hemolytic anemia (46 percent). Thalassemia major has the lowest mean hemoglobin value of the hemolytic anemias studied, with 5.3 gm/dl, followed by thalassemia intermedia with 7 gm/dl. The highest reticulocyte count was found in thalassemia major, with a mean value of 7.3, which is similar to the findings of Preethi *et al* [9], who found that the reticulocyte count in thalassemia major ranged from 5- 15%.

Beta thalassemia phenotype was found to be the most common with 38 percent, with mean Hb of 7.3gm/dl, mean reticulocyte count of 3.2, and mean HbA2 of 5.9%, which was close to Venkataswamy *et al*. [7] who found it to be 28.26 percent of all cases with mean Hb and HbA2 of 13.3gm/dl and 6.2 percent, respectively. Electrophoresis of HbA2 levels and peripheral smear findings supported the diagnosis of thalassemia trait. A history of tranfusions was observed, as well as a mean HbF of less than 70%. Serum bilirubin was shown to be elevated in almost all cases, and Preethi *et al*. reported a similar finding [9].

Sickle cell anemia was the second most common form of anemia in the sample, accounting for 20% of all cases; a similar finding was seen in Venkataswamy [7], with 5.6 percent of cases. The mean hemoglobin and reticulocyte count was 8.2 gm/dl and 4.2 which was similar to Venkataswamy [7] where mean values were 7.5 gm/dl and 14.6.

Beta thalassemia major had 13% cases in total with mean hemoglobin, reticulocyte count and HbF of 5.3gm/dl, 7.4 and 92% and similar findings were observed in Venkataswamy where total cases were 16.45% and the mean Hb, reticulocyte count and HbF were 6gm/dl, 4.6, 96% and in Preethi *et al*. [9], the Hb ranged from 3-8.2 gm/dl, reticulocyte count from 4-18% and HbF mean was 75.2%. Anusha R [10] discovered a similar result. The study found frequent blood transfusions, which is close to Venkataswamy, who found that 100 percent of beta thalassemia major cases needed frequent transfusions.

Sickle cell thalassemia, in the present study was 3% with mean Hb, reticulocyte count and mean HbS of 7gm/dl, 7 and 54.6% which is similar to Venkataswamy[6] where it was 9% and Anusha R where it was 6.2% with mean vaues of hemoglobin and retic count of 7.7gm/dl, 7.2 and 6.2gm/dl, 7% and mean of HbS of 60.4%. Total serum bilirubin in the study was 3.1mg/dl which is similar to Anusha R[10] study with 2.7mg/dl.

Thalassemia intermedia, 4% of all cases had mean hemoglobin, retic count and mean HbF of 6.3gm/dl,3.6 and 48% which is similar to Venkataswamy[7] and Anusha R[10] with mean vaues of 6.2gm/dl, 3.6 and 4.2gm/dl, 3.7 and mean of HbF noted were of 58.92 and 46%. The total serum bilirubin level in the sample was 2.8mg/dl, which is close to the 2.6mg/dl level in the Anusha R study.

Sickle cell phenotype affected 2% of all cases, with mean Hb and retic counts of 9.1 gm/dl and 2.9, respectively. Venkataswamy found that sickle cell syndrome affected 1.55 percent of all cases, with mean Hb and retic count values of 10.8gm/dl and 1.95, respectively. The current study's mean HbS was 43.2 percent, which is close to Venkataswamy's figure of 40 percent.

One case of Hereditary Spherocytosis was found in this study, with mean Hb and retic counts of 6.6gm/dl and 3.2, respectively, which is close to Anusha R, who found 6.4gm/dl and 7. In this scenario, there was a positive background. In this situation, osmotic fragility was improved. Based on peripheral smear findings and G6PD estimation assay, two cases of G6PD and AIHA were identified. Only AIHA had a positive direct Coomb's test. Electrophoresis revealed one case of Hb D Punjab, which was diagnosed by the presence of a band in the HbS/D area.

Consanguinity was found in 6 cases in my sample, which is close to Anusha R's study, which found consanguinity in 15 cases, and Preeti *et al*'s study, which found consanguinity in 55 percent of cases. The study found a male to female ratio of 1.4, which is close to Chatopadhyay [11] and Preethi *et al*. [9] Similar finding was observed in Venkataswamy where the ratio was 1.75:1. In the Anusha R study, the male to female incidence was 0.9, and all patients with beta thalassemia major had hepatosplenomegaly, which was close to Venkataswamy's study. Microcytic hypochromic red blood cells, target cells, schistocytes, polychromatophilia, tear drop cells, elliptocytes, anisopoikilocytosis, sickle cells, normoblasts, and hemoglobin electrophoresis are all

peripheral smear findings of hemolytic anemia.

Conclusion

Hemolytic anemia is not evenly distributed in India, and its occurrence ranges from state to state and community to community. Thalassemia major is the most extreme of the hemolytic anemias, requiring repeated transfusions and having the greatest levels of morbidity and mortality. Since the majority of the population in our country is unaware of the disease, further efforts should be made to raise consciousness among patients. It's important to develop better screening tools so that preventative steps and appropriate care can be administered as soon as possible.

Funding: No funding sources Conflict of interest: None

References

1. Weatherall DJ, Clegg JB. The thalassemia syndromes, 4th edition: Oxford Blackwell scientific publications, 2001.
2. Henry's Clinical diagnosis and management, First South East Asian edition 2016;1:86-87.
3. Ambekar SS, Phadke MA, Balpande DN, Mokashi GD, Khedkar VA *et al*. The prevalence and heterogeneity of beta thalassemia mutations in the western Maharashtra population. IJHG 2001;1(3):219-223.
4. Balgir RS. The burden of hemoglobinopathies in India and the challenges ahead 2000;79(11):1536-47.
5. Balgir RS. Spectrum of hemoglobinopathies in the state of Orissa, India, a ten years cohort study JAPI 2005; 53:1021-26.
6. Varawalla NY, Old JM, Sarkar R, Venkatasen R *et al*. The spectrum of beta thalassemia mutations on the Indian subcontinent: the basis of prenatal diagnosis. Bristish journal of haematology. 1991;78(2):242-247.
7. Venkataswamy *et al*. Clinicohematological profile of hereditary haemolytic anaemia in tertiary care hospital in South India JCDR. 2017;11(6):EC17-EC21.
8. Shivashankara AR, Jailkhani R, Kini A. Hemoglobinopathies in Dharwad, North Karnataka, A hospital based study JCDR 2008;2:593-599.
9. Preethi BP, Monika K, Maitrreyee DS. A hospital based study of hereditary hemolyticanemia in Davanagere district of Karnataka, India. Bangladesh journal of medical science 2010;9(3):154.
10. Anusha R, Sravanthi NL. Vijaylakshmi Clinicohematological profile of hemolytic anaemia in tertiary care hospital in rural Andhra Pradesh 2016,3(5).
11. Chattopadhyay K, Biswas R. An epidemiological study on the clinicohematological profile of patients with congenital hemolytic anaemia in a tertiary care hospital of Kolkata. Indian J. Prev. Soc. Med 2012;43(4):373.