

INCIDENCE OF HAEMOLYTIC ANAEMIA IN A TERTIARY CARE CENTRE IN CENTRAL KERALA, INDIASunitha Balakrishnan¹, P. S. Jayalakshmy², Meenu Venukumar³¹Associate Professor, Department of Pathology, Government Medical College, Thrissur.²Additonal Professor, Department of Pathology, Government Medical College, Thrissur.³Junior Resident, Department of Pathology, Government Medical College, Thrissur.**ABSTRACT****BACKGROUND**

Haemolytic anaemias can be classified as intrinsic, where the cause is related to the defect in red cells or extrinsic, where factors external to the RBC cause red cell destruction. In intrinsic type the abnormality is in the RBC membrane, enzyme or haemoglobin, whereas in extrinsic type the abnormality is immune mediated due to toxins or direct trauma. They can also be classified as inherited haemolytic anaemias and acquired haemolytic anaemia. The present study was carried out to assess the magnitude of different types of haemolytic anaemias diagnosed in a tertiary care centre in central part of Kerala, India.

MATERIALS AND METHODS

The study was conducted in the Department of Pathology, Government Medical College, Thrissur, for a period of 3 years from 01-09-2012 to 31-08-2015. All the clinically suspected cases of haemolytic anaemias, i.e. cases with anaemia and jaundice were considered; the cases without definitive diagnosis were excluded from the study.

RESULTS

Total of 114 haemolytic anaemia cases were studied, of which 51.75% (59 cases) were females and 48.24% (55 cases) were males. Hereditary haemolytic anaemia accounted for 74.56% (85 cases) and acquired haemolytic anaemia were 25.43% (29 cases). The patients were in the age group of 3 days (new born) to 70 years.

DISCUSSION

Of the 114 cases, sickle cell disease was the commonest followed by microangiopathic haemolytic anaemia. The other hereditary haemolytic anaemia in this study included thalassemia, sickle-thal, Hb E disease, Hb E - β Thal, hereditary spherocytosis, G6PD deficiency and porphyria. Acquired haemolytic anaemia include immune haemolytic anaemia, microangiopathic haemolytic anaemia and drug-induced haemolysis.

CONCLUSION

The study is mainly done to assess the magnitude of haemolytic anaemia and the different aetiological factors. It also reveals the importance of additional investigations, which help considerably to find out the cause.

KEYWORDS

Sickle Cell Anaemia, Microangiopathic Haemolytic Anaemia, Immune Haemolytic Anaemia.

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BACKGROUND

The normal lifespan of RBCs is 90-120 days. Increased red cell destruction results in haemolysis and the patient present with anaemia. There are many types of haemolytic anaemia, which may be classified according to the means of haemolysis. That can be either intrinsic where the cause is related to the Red Blood Cell (RBC) itself or extrinsic where factors external to the RBC cause destruction.^[1] In intrinsic type the abnormality is in the RBC membrane, enzyme or haemoglobin whereas in the extrinsic type the abnormality is immune mediated due to toxins or direct trauma.^[1,2]

They can also be classified as inherited haemolytic anaemia and acquired haemolytic anaemias.^[3,4]

In inherited haemolytic anaemia, one or more of the genes that control red blood cell production are faulty. This can lead to abnormalities with the haemoglobin, cell membrane or enzymes that maintain healthy red blood cells.^[2,5] The abnormal cells may be fragile and break down while moving through the bloodstream. Inherited haemolytic anaemia include sickle cell anaemia, thalassemia, hereditary spherocytosis, hereditary elliptocytosis, G6PD deficiency, pyruvate kinase deficiency, etc.^[3,6]

In acquired haemolytic anaemia, red blood cells may be normal but some other disease or factors destroy red blood cells and remove them from the bloodstream. The destruction of the red blood cells occur in the bloodstream or more commonly in the spleen.^[2,3] Acquired haemolytic anaemias include immune haemolytic anaemia, drug-induced haemolytic anaemia, microangiopathic haemolytic anaemia, PNH and infections like malaria and Leishmaniasis, snake venom, toxic chemicals, etc.^[3]

Both hereditary and immune haemolytic anaemias have been studied individually and reported from various parts of India, but the haematological profile in haemolytic anaemias in general affecting all age groups are rarely reported. The

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present study was carried out to assess the magnitude of a variety of haemolytic anaemias diagnosed in a tertiary care centre in central part of Kerala.^[3,7]

MATERIALS AND METHODS

The study was conducted in the Department of Pathology, Government Medical College, Thrissur, for a period of 3 years from 01-09-2012 to 31-08-2015. All the clinically suspected cases of haemolytic anaemias, i.e. cases with anaemia and jaundice were considered, but the cases without definitive diagnosis were excluded from the study.

A total of 114 cases belonging to different aetiologies and all age groups were studied. This included 59 females and 55 males. The cases were subjected to routine and special investigations.

These Include

- Complete blood count (Sysmex 5-part cell counter).
- Peripheral smear examination (Leishman stain).
- Reticulocyte count (Brilliant cresyl blue, 1%).
- Osmotic fragility test.
- Sickling test (using 2% Sodium metabisulphite as reducing agent).
- Serum bilirubin.
- Direct Coombs test.
- Hb electrophoresis (in some cases).
- High Performance Liquid Chromatography - HPLC (in some cases).

RESULTS

Total of 114 haemolytic anaemia cases were studied, of which 51.75% (59 cases) were females and 48.24% (55 cases) were males [Fig. 1]. Hereditary haemolytic anaemia accounted 74.56% (85 cases) and acquired haemolytic anaemia were 25.43% (29 cases) [Fig. 2]. The patients were in the age group of 3 days (new born) to 70 years [Fig. 3].

Sl. No.	Type of Haemolytic Anaemia	Percentage
1	Sickle cell disease	38.6%
2	Thalassemia	10.5%
3	Sickle-thal	5.3%
4	Hb E disease	2.6%
5	Hb E-Beta thal	0.8%
6	Hereditary spherocytosis	10.5%
7	G6PD deficiency	5.3%
8	Microangiopathic haemolytic anaemia	11.40%
9	Haemolytic disease of newborn	0.8%
10	Autoimmune haemolytic anaemia	7.9%
11	Porphyria	0.8%
12	Drugs/chemicals induced haemolytic anaemia	3.5%
13	Spur cell anaemia	1.8%

Table 1: Percentage of Haemolytic Anaemia Cases in this Series

All the cases in the study were properly clinically correlated. All were found to have hyperbilirubinaemia. All the cases positive for sickling test [Fig. 4] were diagnosed as sickle cell disease. Those with sickle cells in the peripheral smear

were diagnosed as sickle cell anaemia [Fig. 5]. The cases with positive sickling test and peripheral smear showing microcytic hypochromic anaemia with scattered target cells were advised to do Hb electrophoresis/HPLC to confirm Sickle-thal. Those with negative sickling test and peripheral smear showing microcytic hypochromic anaemia and target cells with normal RDW are also advised to do Hb electrophoresis/HPLC to confirm other hereditary haemolytic anaemia like thalassemia [Fig. 6, 7], Hb E, Hb E-thal [Fig. 8, 9] etc. Microangiopathic Haemolytic Anaemias (MAHA) showed evidence of haemolysis and fragmented RBCs and spherocytes [Fig. 10]. G6PD deficiency was associated with drugs, mainly dapsone. Peripheral smear showed bite cells and blister cells [Fig. 11] and Heinz body could be demonstrated. All immune haemolytic anaemias were positive for Direct Coombs Test. All spherocytic haemolytic anaemias in young individuals with splenomegaly were further investigated with osmotic fragility test and family screening. All hereditary spherocytosis cases showed increased osmotic fragility.

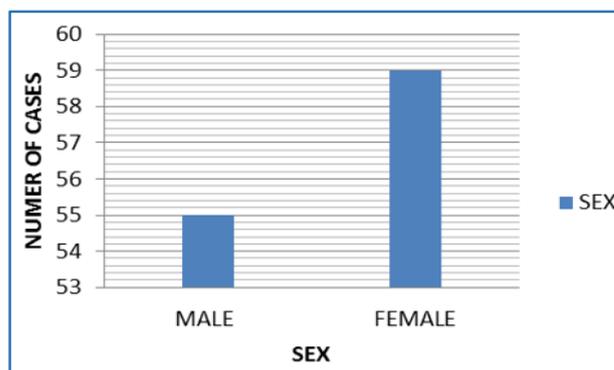


Fig. 1: Sex Distribution of Haemolytic Anaemia

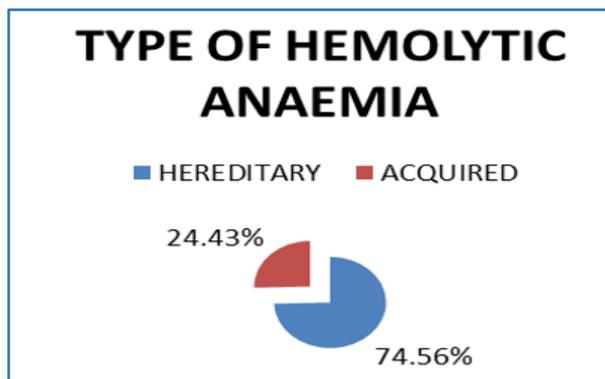


Fig. 2: Type of Haemolytic Anaemia

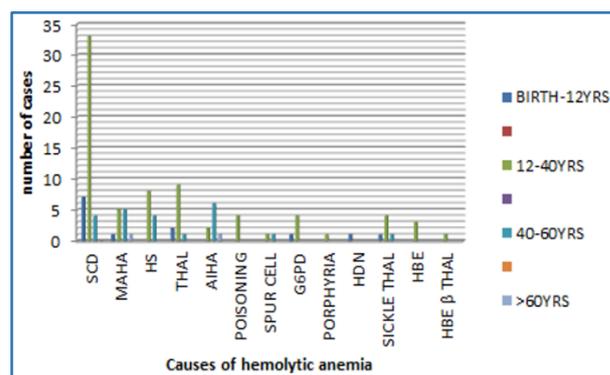


Fig. 3: The Age Distribution



Fig. 4: Positive Sickling Test - [Leishman X 1000]

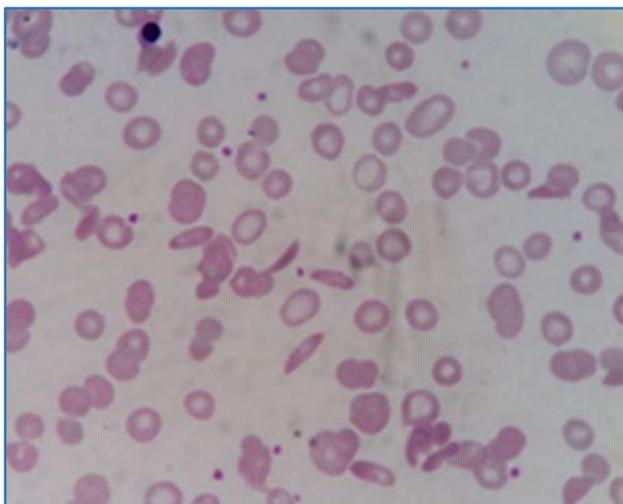


Fig. 5: Sickle Cell Anaemia [Leishman X 1000]

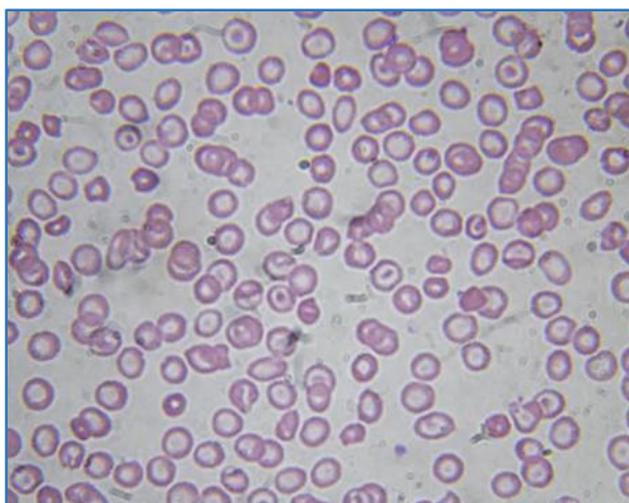


Fig. 6: Thalassaemia - Minor [Leishman X 1000]

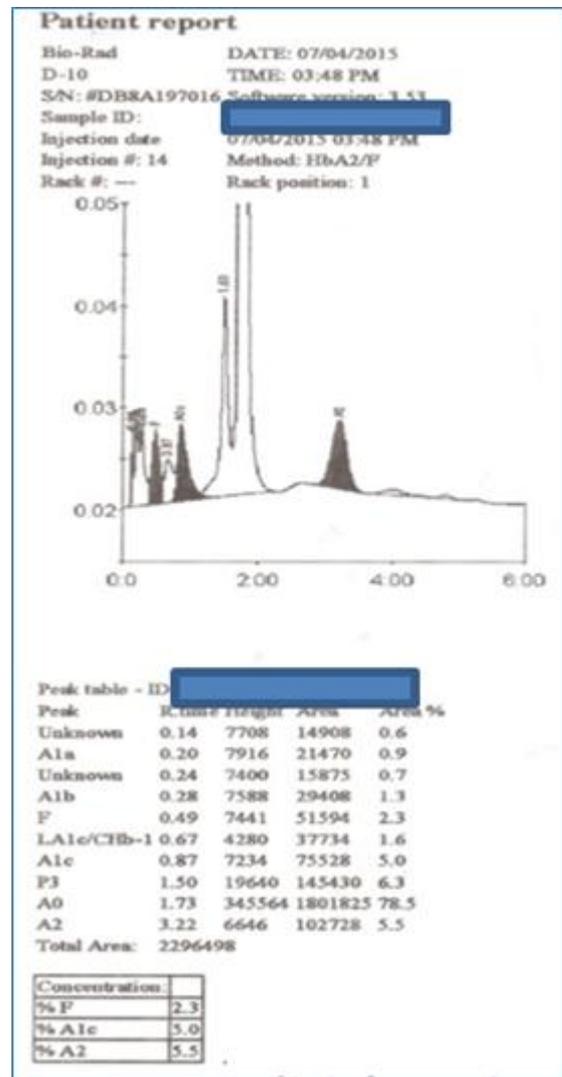


Fig. 7: HPLC - Thal-Minor



Fig. 8: Hb Electrophoresis Hb E β Thal

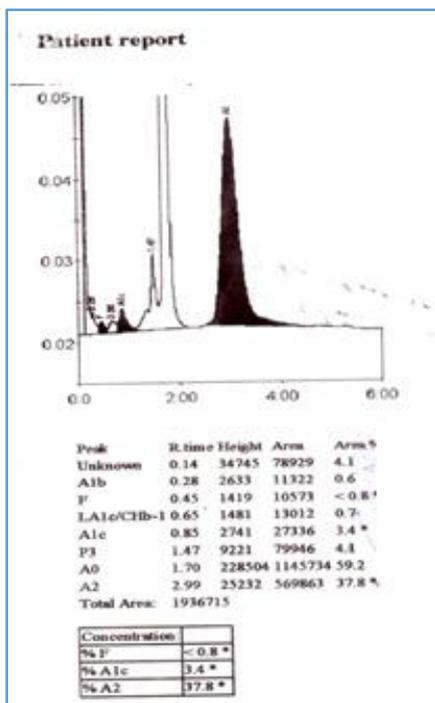


Fig. 9: HPLC - Hb E-Beta Thal

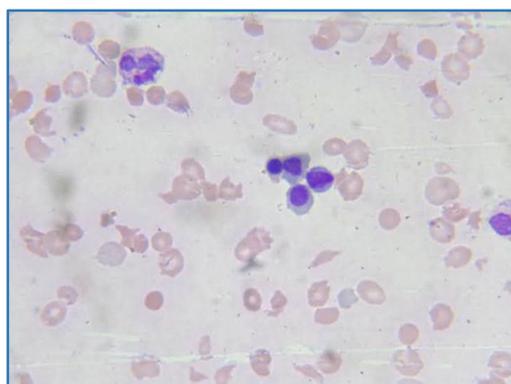


Fig. 10: MAHA - Leishman X 1000

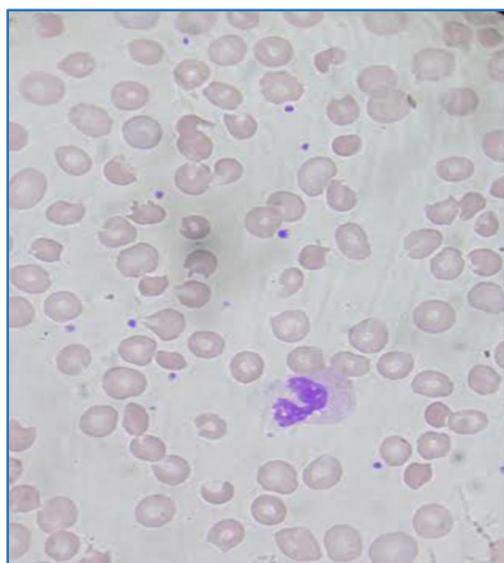


Fig. 11: G6PD Deficiency - Leishman X 1000

anaemias which accounted for 74.6%. Acquired haemolytic anaemias were 29, which accounted for 25.43%. In the hereditary haemolytic anaemias, commonest was sickle cell disease (38.6%) [Table 1]. Sickle cell disease is one of the most common monogenic disorders globally with autosomal recessive inheritance. In the study conducted by Giri et al at Baroda (Gujrat) in 1984, there were 51 cases of haemolytic anaemia in which beta thalassaemia major was leading cause with 29 cases and sickle cell anaemia was 2nd with 15 cases.^[7] The increase in the number of sickle cell disease in the study may be due to the increased prevalence of the disease among the tribal population in Attappadi, Palakkad District, which is the neighbouring district of Thrissur.^[8] Another cause may be the increased number of migrant worker population from the North East States of India, i.e. Odisha, Bihar and West Bengal where sickle cell disease is prevalent.^[9,10]

In our study, 6 cases (5.3%) showed associated thalassaemia component along with sickle cell disease which was proved by either Hb electrophoresis or HPLC. Roshan et al from Odisha showed the presence of HbS-β thalassaemia.^[11] In Kerala also, there are studies showing increased incidence of HbS-β thalassaemia. All the three Hb E disease and one Hb E-β thal were from the migrant worker population. Hb E is widely distributed in the North Eastern states.^[11]

In our study, there were 6 cases (5.3%) of G6PD deficiency. All of them showed the classical bite cells and blister cells in the peripheral smear. One among those was a newborn with very low levels of G6PD.^[12] Another case was that of a migrant from Odisha with associated Hb E-β thalassaemia. He had severe haemolysis due to the oxidant stress. The rest of the cases were drug induced. Padmasree et al in their study show that it is mainly produced by antimalarial drugs, but all our cases were dapson induced while on treatment for leprosy.

In the present study, Microangiopathic Haemolytic Anaemia (MAHA) was the second commonest haemolytic anaemia (11.4%). The disease had a variety of causes. Predominant cause was haemolytic uremic syndrome. Patients were children presenting in acute renal failure. The other causes included Disseminated Intravascular Coagulation as a sequel to infections like chicken pox, pneumonia, HELLP syndrome and snake bite.

We also had a rare case of late onset congenital erythropoietic porphyria. It was a 41-year-old female who presented at the age of 20 with hyper and hypopigmentation of skin and sclerodactyly. She had brownish discoloration of teeth, which showed red fluorescence in UV light and her urine also showed reddish pink fluorescence in UV light. Her peripheral smear showed evidence of haemolysis. To the best of our knowledge, only 17 cases of late onset congenital erythropoietic porphyria have been reported till date^[13,14] in the literature.

CONCLUSION

In the present study conducted in a tertiary care hospital, there were 114 proven cases of haemolytic anaemia over a period of 3 years with a variety of causes and involving all age groups. The study is mainly done to assess the magnitude of haemolytic anaemia and the different aetiological factors. Additional investigations has to be done, which help considerably to find out the cause.

DISCUSSION

In the present study there were 114 proven cases of haemolytic anaemia; 85 cases were hereditary haemolytic

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