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SHORT COMMUNICATION

Haematological Profile in Haemolytic Anaemia

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Abstract: *Objectives:* The present study was carried to find out the frequency of haemolytic anaemia, to know the different etiological factors and their percentage in the region of marathwada, Maharashtra. *Background:* Knowledge of frequency and different etiological factors is essential for the information of magnitude and treatment of the patients. The present study was done in the department of pathology, Gov. Medical College, Aurangabad, district of Maharashtra. The patients from marathwada region of the Maharashtra were included in this study. The concerned study of "Haemoglobinopathies in Childhood" was conducted by Anil J in 1984 in the same institute. *Methodology:* Total 76 clinically suspected cases were investigated. For the study routine investigations like Hb estimation, peripheral blood smear examination, reticulocyte count and special investigations like sickling test, Hb solubility test, estimation of faetal haemoglobin and Hb electrophoresis were carried out. *Results:* Total 76 cases were studied. Out of it 51 cases were male (67.10%) and 25 (32.89%) cases were female. The patients are in the age group, 5 months to 45 years. Out of 76 cases 51 cases were diagnosed as haemolytic anaemia. In these 51 cases of haemolytic anaemia, 42 cases (82.35%) of haemoglobinopathies, it cases (15.68%) of malaria and one case (1.96%) of auto immune haemolytic anaemia were found to have as causative factor. *Conclusion:* It showed that the frequency of haemolytic anaemia in studied 76 cases was 67.10%. In diagnosed 51 cases of haemolytic anaemia, the causative factor as haemoglobinopathy was 82.35% and other than haemoglobinopathy was 17.65%. It also showed that majority of the cases in this region were belonging to beta thalassaemia major, which is more common in western zone of India followed by sickle cell anaemia.
Keywords: Haemolytic anaemia,Haemoglobinopathy,Hb electrophoresis.

Introduction

Increased rate of red cell destruction causes haemolytic anaemia. The life-span of red cell is 90-120 days. In haemolytic anaemia it is shortened by varying degrees. Haemolytic anaemia can be categorized into two main groups, intrinsic and extrinsic, depending upon where the defect lies. In intrinsic abnormality, defect lies either in the membrane, enzymes or haemoglobin of the red cells. In extrinsic abnormality, defect is either immune, mechanical, direct toxic effect on red cells, paroxysmal nocturnal haemoglobinuria (PNH) or splenornegaly [1]. Shorting of life span of red cells does not necessarily result in anaemia. Due to compensated bone marrow hyperplasia haemolytic anaemia may be absent in haemolysis. Anaemia results when the hyperplasia of bone marrow is unable to compensate.

The haematological profile in different etiological groups such as anaemia in pregnant Indian women, autoimmune haemolytic anaemia, sickle cell anaemia, acute and chronic *Plasmodium falciparum* malaria, Hbs amd glucose 6 phosphate

dehydrogenase deficiency, haemoglobinopathies in childhood and Hbs in splenomegaly have been reported from various parts of India [2-7] but the haematological profile in haemolytic anaemia in different etiological groups and in all age groups is rarely reported. The present study was carried to assess the magnitude of haemolytic anaemia in different etiological groups and all age groups in the Aurangabad district of Maharashtra.

Material and Method

A total of 76 cases belonging to different etiology and all age groups were studied. 51 cases of male and 25 cases of female were included in these 76 cases. The clinically suspected cases with hepatosplenomegaly and anaemia were included in the present study. The cases were subjected to routine and special investigations as follows:

1. Routine haematological investigations–such as haemoglobin estimation by cyanomathaemoglobin method, peripheral smear examination (Leishman stain), retculryte connt (brilliant crysel blue 1%), serum bilirubin (van den berg's method) and bone marrow examination if needed.
2. Special investications–such as Sickling test by using 2% sodium metabisulphite as reducing agent, Hb-S solubility test and estimation of faetal haemoglobin was carried by using conventional techniques [2]. For the confirmation of haemoglobinopathies agar gel Hb eletrophoresis was carried out [2-3].

Result

In this study, a total 76 suspected cases of haemolytic anaemia were investigated for haemolytic anaemia. In this 51 cases (67.10%) were male and 25 cases (32.89%) were female. The patients are in the age group 5 months to 45 years. Out of 76 cases studied, 51 cases were found to have haemolytic anaemia. Out of these 51 cases, 42 cases were found to have haemoglobinopathies, eight cases were found to have malaria on peripheral blood smear examinations and one case of autoimmune haemolytic anaemia was diagnosed in which direct comb's test was positive (Tab-1).

Table-1: Percentage of Cases of Haemolytic Anaemia in this Series

Sr. No	Type of haemoglobonopathy	Percentage
1	Beta Thalassaemia	41.17 %
2	Sickel Cell Anaemia	23.52 %
3	Beta Thalassaemia Minor	05.88 %
4	Sickel Cell Thalassaemia	05.88 %
5	Sickel Cell Trait	03.92 %
6	Hb-E Thalassaemia	01.96 %
7	Autoimmune Haemolytic Anaemia	01.96 %
8	Maleria	15.68 %
	Total	**100.00 %**

Out of 42 cases of haemoglobinopathies, 21 cases (50%) were belonging to beta thalassaemia major, 12 cases (28.5%) to sickle cell anaemia, three cases (7.14%) to sickle beta thalassaemia, three cases (7.14%) to beta thalassaemia minor, two cases (4.76%) to sickle cell trait and one case (2.38%) to Hb-E beta thalassaemia. Out of 21 cases of beta thalassaemia mojor 18 showed B+ type and 3 showed B^0 type but there was no difference in the severity of disease. In sickle cell anaemia seven cases showed S - S pattern while five cases showed SF pattern (Tab-2).

Table-2: Haemoglobin Electrophoresis Pattern in Haemolytic Anaemia

Sr. No.	Etiological Factor	Total No. Cases	Electro Pattern	Pattern Wise Cases	Percentage
1	Beta Thal. Major	21	A2FA	18	35.29
2			A2F	03	05.88
3	Sickle Cell Anaemia	12	SS	07	13.72
4			SF	05	09.80
5	Beta Thal. Minor	03	A2A	03	05.88
6	Sickle Cell Thal.	03	SF	02	03.92
7			A2SF	01	01.96
8	Sickle Cell Trait	02	SA	02	03.92
9	Hb-E Thala.	01	EFA	01	01.96
10	Autoimmune H.A.	01	A2A	01	01.96
11	Malaria	08	A2A	08	15.68
	Total	**51**		**51**	**100.00%**

Few electrophoretic patterns of Hb have been shown in figure 1, 2 & 3.

Fig-1: Showing Electrophoretic Pattern of a patient of Beta Thalassaemia and sickle cell thalassaemia with control A_2FA

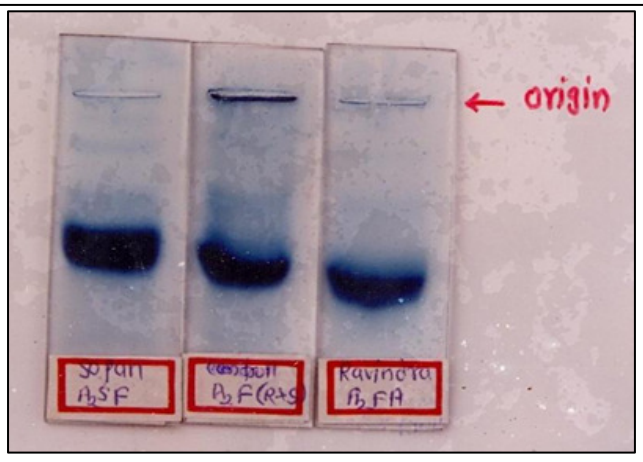


Fig.2: Showing electrophoretic pattern of a patient having beta thalassaemia major (A_2FA) with his father and mother (A_2 increased)

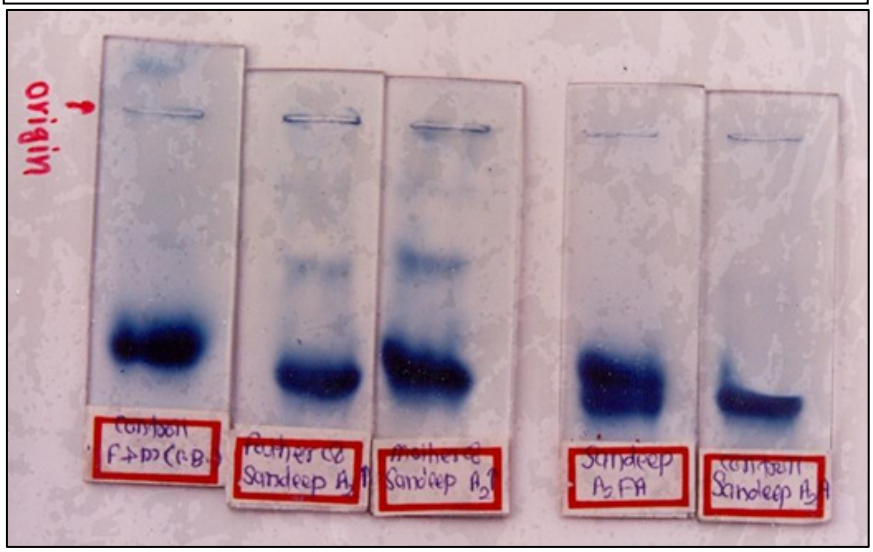
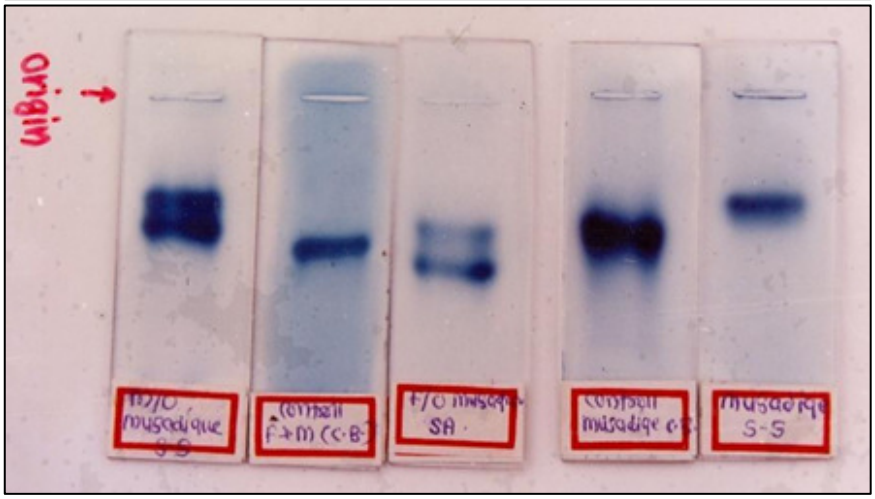


Fig.3: Showing electrophoretic pattern of a patient of sickle cell anaemia (SS) with control and his mother (SS) Father (SA)



Peripheal smear examination in beta thalassaemia major showed microcytic, hypochromic with sever anisopoikilocytosis and target cells with evidence of regeneration. In sickle cell anaemia, the picture was either normocytic hypochromic or with mild anisocytosis and microcytes with evidence of regeneration. In few cases sickle cells were seen. In beta thalassamia minor, picture was microcytic hypochromic or normocytic, mild hypochromic with few target cells and no evidence of regeneration.

Sickling test and Hb-S solubility test was positive in all homozygous and heterosygous cases of sickle cell anaemia. Direct Coomb's test was positive only in a case of autoimmune haemolytic anaemia (AIHA).

Age wise distribution of cases showed that 66.66 % of cases beloging to beta thalassaemia major were below three years of age and 83.33 % of cases of sickle cell anaemia were above the age of three years. The average percentage of Hb in male was 5.94 grms% and that of in female was 6.2trms%. The prevalence was more in males (34 cases) in this series than females (17 cases). The male: female ratio was 2:1 (Tab-3)

Table-3: No. of Etiological Factors in Male and Female Cases

Sr. No.	Etiological Factor	Male	Female	Total
1	Beta Thalassaemia major	15	6	21
2	Sickle cell anaemia	7	5	12
3	Beta thalassaemia minor	2	1	3
4	Sickle cell thalassaemia	2	1	3
5	Sickle cell trait	1	1	2
6	Hb-E thalassaemia	-	1	1
7	Malaria	6	2	8
8	Auto immune haemolytic anaemia	1	-	1
	Total	**34**	**17**	**51**

Discussion

In the present study, a total of 76 cases were studied, out of which 51 cases were found to have haemolytic anaemia. A total of 42 cases were found to have haemoglobinopathies accounting to 82.35 %. These findings fairly correlate with earlier reports from India. Joshi Anil in 1986 studied haemoglobinopathies at aurangabad district of maharashtra, where beta thalassaemia major was leading cause with 38 cases out of 70 cases and sickle cell anaemia stood 2nd with 17 cases out of 70 [3]. Similar type of study was conducted by Giri etal at boroda (Gujrat) in 1984. They studied 51 cases was hemolytic anaemia in which beta thalassaemia major was leading cause with 29 cases and sickle cell anaemia was 2nd with 15 cases. (This reference is quoted by Joshi Anil) The maximum number of cases of beta thalassaemia major have been commonly reported from Western zone of country [3]. Maximum cases of sickle cell anaemia have been commonly reported from Eastern Zone of India. In our study, maximum number of cases were found to belong to beta thalassaemia major followed by sickle cell anaemia. Our study resullts from this area of Aurangabad region, which forms the part of Western zone of country fairly correlate with these earliar findings. In the present study, 14 (66.66%) cases of beta thalassaemia major were below the age of three years, majority of them were males and nontribals. This finding matches with varoius studies reported earlier [3].

In this series two cases of Sickle Cell trait were detected. This correlates with the firding of Joshi Anil [3]. Eight cases of malaria [4] and one case of AIHA [5] were found as a cause of haemolytic anaemia. Sickle cell anaemia was 2nd as etiological factor which correlates with findings of Balgir et al [6]. Study of various etiological factors of haemolytic anaemia such as distribution of sickle cell anaemia in India, Sickle cell Hb and G_6PD deficiency , splenomegaly in patients with sickle cell anaemia was reported form different parts of India [6-8].

Results of present study indicate that the prevalence of haemolytic anaemia in this region is 67.10% in clinically suspected haemolytic anaemia. Considering its high magnitude, a careful search to detect haemoglobinopathies is necessary. The results also indicate the importance of additional investigations, which help considerably to find out different rare etiological factors of haemolytic anaemias.

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