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A Prospective Study on Haemotological Profile of Sickle Disease

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ABSTRACT

Objectives and Aim: The aim of this study was to determine Haematological profile of Sickle cell disease (SCD) from Karimnagar Region, Telangana, India

Methods: This Prospective Cross-Sectional Study was conducted in the Department of Paediatrics, Prathima institute of medical sciences, Karimnagar India, between June 2019-Feb 2020.37 children between the age of 6 years to 15 years

Results: A total of 37 children's homozygous (SS) (mean age 11.6±3.4 years) for sickle cell anaemia was studied for their haematological parameters. Out of the total SS subjects, 26 were males and 11 were females

Conclusion: We conclude that moderate to severe anaemia with, low MCV and high HbF dominate the haematological profile

Key words: Hb, HCT, RBC, MCV, MCH, MCHC, HbF,,WBC.

Introduction

This Prospective Cross-Sectional Study was conducted in the Department of Paediatrics and with the help of Sickle Cell Anaemia Laboratory, Department of Pathology, Prathima institute of medical sciences, Karimnagar India, between June 2019-Feb 2020. Patients in this study were in steady state for a long period without any clinical features related to SCD or other diseases

which would affect the haematological values. Venous blood of all patients was collected in ethylenediaminetetraacetic acid EDTA tubes and haematological values were measured. Thirty-Seven (37) subjects homozygous in all were studied for their haematological value for sickle cell anaemia. Moderate to severe anaemia, low mean cell volume and high foetal haemoglobin dominate the haematological profile of SCD children, The sickle cell disease (SCD) is a very common single gene disorder; 40%-50% of world population affected by SCD resides in India. The average frequency of SCD gene ranges between 21-42%. High prevalence of sickle gene has been demonstrated in various tribal communities.[1] Haematological profile of SCD is extremely variable. There is scarcity of data on hematological profile of SCD from India. Therefore, this study was undertaken to determine hematological profile of SCD, catering tribal patients

Materials and Methods

This prospective cross-sectional study was conducted in the Department of Pediatrics and Sickle Cell Anemia Laboratory, Department of Pathology, Prathima institute of medical sciences, Karimnagar India, between June 2019-Feb 2020.Most of patients were from tribal background and lower socioeconomic status. Before conducting the study, permission was obtained from the Ethical Clearance Committee. Patients included in this study were in their stable state for a long period without any clinical features related to SCD or other diseases which could affect the hematological values. Children's who have been transfused in the previous 6 months were not included in the present the study. Detail history and family history with previous blood transfusion was evoke to obtain information on all SCD related symptoms. Most of the blood samples are collected during Outpatient pediatric Department visit. Venous blood of all patients was collected in ethylenediaminetetraacetic acid (EDTA) tubes and hematological values were measured on KX 21 Sysmex auto analyzer. Quantification of fetal hemoglobin (HbF) was done on Bio-Rad variant system using high performance liquid chromatography (HPLC).

Statistical analysis

Data collected and written on a designed Performa and managed on Excel sheet. All the entries were checked twice for any possible error. Statistical analysis was done by unpaired t- test with the help of Epi info 6 (CDC, Atlanta).

Results

A total of 37 children's homozygous (SS) (mean age 11.6±3.4 years) for sickle cell anaemia was studied for their haematological parameters. Out of the total SS subjects, 26 were males and 11

were females. Males to female's sex ratio: 2.3. 6 years to 14 years of childrens were taken. Mean (SD) age of male was 9.4 (3.29) years whereas SD age of female was 9.59 (3.59) years. Haematological value of study are mentioned below

Table : Haematological comparison between male and female sickle cell patients (n=37)

	Male(n=26) Mean±SD	Female(n=11) Mean±SD	Total(n=37) Mean±SD	P Value
Hb (g/dL)	7.76±1.77	7.31±1.82	7.63±1.76	0.54
HCT (gm/dL)	27.25±3.74	25.49±7.59	26.39±5.15	0.61
RBC (mill/mm^3)	3.41±0.86	2.85±0.86	3.33±0.89	0.08
MCV (fL)	76.09±5.57	75.57±5.77	75.80±5.53	0.78
MCH (pg)	26.51±2.11	25.89±1.52	26.20±2.02	0.43
MCHC (g/dL)	32.64±1.14	32.84±0.73	32.86±0.87	0.66
HbF (%)	12.46±7.50	11.87±6.58	12.1±7.21	0.73
WBC (× 103 µL)	10.5±6.5	14.2±5.7	11.5±6.3	0.16

Hb, hemoglobin; HCT, hematocrit; RBC, red cell count; MCV, mean cell volume; MCH, mean cell hemoglobin; MCHC, mean cell hemoglobin concentration; HbF, foetal hemoglobin; WBC, white blood cells.

Discussion

There were a greater number of males as compared to females in the present prospective study, which may be due to the fact that male child gets more attention as compared to female child. Total haemoglobin (Hb) is low in SCD female's patient as compared to males although this is not statistically significant (P>0.05) This may be due to haemolysis, blood loss due to haematuria,2 repeated infections, and nutritional deficiencies because of low socioeconomic status. According to National Family Health Survey (NFHS-3), anaemia is common in India among the schedule cast and tribes and among the children with low socio-economic status.[3] Total red cell count count, mean cell haemoglobin (MCH) and mean cell haemoglobin concentration (MCHC) are low in our study which is comparable to other studies.[4] Mean cell volume (MCV) is low in our study as compared to other study.[5] Usually MCV is high in SCD patients because of the increasing need of erythropoiesis due to chronic haemolysis leading to macrocytosis. It would also be related to a folic acid deficiency. Low MCV in our study as compared to other study may be due to co-existing iron deficiency anaemia and other unknown factors such as thalassemia which is frequent and often associated to SCD.[6,7] Mean HbF level was high and no sex related difference in HbF values was observed in present study (P>0.05). Although HbF value (12. 3%) was higher than in African study yet it was low as

compared to Indian studies.[8,9] Indian patients usually carry haplotype, which is associated with high HbF levels, which fails to copolymerize with abnormal haemoglobin (HbS).[10] The difference in level of different studies may be due to coinheritance trait of both thalassemia gene or a strong genetic component and clinical status of the patients.[11]

Conclusions

We conclude that moderate to severe anemia with, low MCV and high HbF dominate the hematological profile

Conflict of interest

Nil.

Ethical approval

The study was approved by the Ethics Committee of Pediatric Department, Prathima institute of medical sciences Karimnagar.

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