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Hematological profile among Sudanese patients with sickle cell anemia

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Abstract:

Sickle cell disease (SCD) is type of haemoglobinopaty and it's produced by single base pair change at the 6th codon of the β gene followed by replacement of an amino acid Glutamine by valine.

The purpose of this study was to determine hematological profile of sickle cell disease (SCD) from Khartoum state, Sudan. This prospective cross-sectional study was conducted in Mohammed Elameen Hamid Hospital for children of Khartoum, Sudan, during the period from December 2014 to January 2015 were enrolled to participate in this study. Patients included in this study were in their steady state for a long period of time without any symptoms related to SCD or other diseases which could affect the hematological parameters. Venous blood of all patients was collected in (EDTA) and hematological indices were measured. Fify subjects homozygous HB (SS) in all were studied for their hematological parameters for sickle cell anemia. Moderate to severe anemia, low mean cell volume in the hematological parameters of sickle cell disease among Sudanese patients.

Key words: Hematological profile, Sudanese patients, sickle cell anemia

Introduction:

Sickle cell disease (SCD) refers to a group of disorders caused by autosomal recessive inheritance of a pairs of abnormal hemoglobin genes, including the sickle cell gene. It is

characterized by chronic hemolytic anemia and acute episodic clinical events called crisis[1]. Vaso-occlusive (painful) crisis is the most common, and other crises are acute hemolytic crisis, sequestration crisis and aplastic crisis [2].

Hematological profile of sickle cell disease is extremely variable. There is paucity of data on hematological profile of sickle cell disease from Sudan. Therefore this study was to determine of hematological profile of SCD in Khartoum State, Sudan.

Objectives:

The purpose of this study was to evaluate the hematological profile in sickle cell disease (SCD) patients referring to Mohammed Elameen Hamid Hospital for children, Khartoum, Sudan .

Materials and Methods

Patient and sample:

This study is a descriptive cross-sectional study, conducted at Mohammed Elameen Hamid Hospital for children, Khartoum, state, Sudan.

Patients included in this study were in their steady state for a long period of time without any symptoms related to SCD or other diseases which could affect the hematological parameters.

Study population:

A total of 50 patients diagnosed with Sickle cell disease HB (SS) attending to Mohammed Elameen Hamid Hospital for children of Khartoum, Sudan, during the period from December 2014 to January 2015 were enrolled to participate in this study.

2.5 mL of blood was collected in ethylene diamine tetra acetic acid (EDTA) for determination of Heamatological profile

Hemoglobin (Hb), Red blood cell count (RBCs) , mean cell volume (MCV), mean cell hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) , White blood cell count (WBCs) by Hematology Analyzer BC(3000) made in china on the same day of collection.

Statistical Analysis:

Data of this study was collected by structured interview questionnaire and analyzed using statistical package for social sciences (SPSS) version 19, Statistical analysis was done by unpaired t- test, In this study $P < 0.005$ was considered as statistically significant.

Ethical considerations:

This study was approved by the faculty of medical laboratory sciences, Al Neelain University, and informed consent was obtained from each participant before sample collection.

Results:

A total of 50 Sudanese patients diagnosed with Sickle cell anemia (HBSS) were enrolled in this study. They were from both sexes; their ages ranged between 3- -15 years (Mean± SD: 7.5 ±3.3), 24 (48%) of the patients were males and 26 (52%) were female. Hematological profile of study subjects are shown in Table 1.

Table 1. Hematological comparison between male and female sickle cell patients (n=50).

	Male (n =24) Mean ± SD	**female (n =26) Mean ± SD**	**p**
HB(g/dl)	7.68±1.87	7.41±1.92	0.56
RBCs(mill/mm³)	3.51±0.96	2.95±0.96	0.08
PCV (gm/dl)	27.45±3.84	26.39±7.69	0.72
MCV(fl)	77.00±5.67	75.67±5.87	0.85
MCH(pg)	26.21±2.11	25.99±1.62	0.45
MCHC(g/dl)	33.84±1	32.94±0.83	0.76
WBC(x10³ul)	10.5±6.3	14.3±5.9	0.16

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

Discussion:

The statistical analysis showed that Total hemoglobin (Hb) is low in SCD patient more so in females as compared to males although this is not statistically significant (P>0.05) This may be due to hemolysis, blood loss due to hematuria, [3].

Anemia is common in Sudan among the list cast and tribes and among the children with low socio-economic status. [4]. Total red cell count, mean cell hemoglobin (MCH) and mean cell hemoglobin concentration (MCHC) are low in our study which is comparable to other studies. [5,6]. Mean cell volume (MCV) is low in our study as compared to other study. [7,8]. Usually MCV is high in SCD patients because of the increasing need of erythropoiesis due to chronic hemolysis 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 anemia and other unknown factors such as a-thalassemia which is frequent and often associated to SCD [9, 10].

Conclusions:

All patients are normocytic normochromic anemia and moderate to severe anemia, low MCV.

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