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ESTIMIATION OF SERUM HEPCIDIN LEVEL IN SUDANESE PATIENTS WITHS SICKLE CELL ANEMIA

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ABSTRACT
Sickle cell disease (SCD) is general term for abnormalities of hemoglobin structure in which sickle gene is inherited from at least one parent. This genetic disorders are characterized by the production of Hb S. A cute and chronic tissue damage secondary to the blockage of blood flow produced by abnormally shaped red blood cells. Sickle cell disease (SCD) patients are characterized by chronic hemolytic anemia, increased erythropoiesis and a chronic inflammatory state with endothelial activation and enhanced red cell and leukocyte adhesion. Sickle cell patients have iron overload due to chronic blood transfusions in the treatment or prevention of the severe sickle cell-related complications such as stroke. Hepcidin It is the major hormonal regulator of iron homeostasis, synthesized by hepatocytes. It inhibits iron release from macrophages intestinal, epithelial cells and form placenta. The peptide hormone hepcidin exerts its function by binding to the trasmembrane cellular iron exporter ferroportin and inducing its internalization and degradation, resulting in decreased intestinal iron uptake and iron retention in the reticulo-endothelial (RE) macrophages. The purpose of this study was to evaluate the serum hepcidin level in Sudanese patients with sickle cell anemia. A total of 45 patients diagnosed with sickle cell anemia based on haemoglobin electrophoresis. serum was separated from participants for ELISA tests to estimate hepecidin level. A total of 45 patients diagnosed as sickle cell anemia (SS) in Sudan, their ages ranges from 5 -20 years. The hepcidin level showed, no correlation with duration of disease and frequency of blood Transfusions. There is association of hepcidin level with RBcs count, hemoglobin and PCV and insignificant correlation of serum hepcidin levels with gender, age and duration of disease.

KEYWORDS: Serum hepcidin, Sickle cell diseases.

INTRODUCTION
Sickle cell diseases (SCD) is a group of blood disorder typically. inherited from a persons parents.[1] The most common type is known as sickle cell anaemia (SCA), it results in an abnormality in the oxygen carrying protein haemoglobin (hemoglobin S) found in red blood cells. This leads to rigid sickle like shape under certain circumstances.[1] Cell Problems in sickle disease typically begin around 5 to 6 months of age. A number of health problems may develop, such as attacks of pain (sickle-cell crisis.

Sickle cell disease occurs when a person inheritts two abnormal copies of the haemoglobin gene, one from each parent.[1] This gene occurs in chromosome 11.[2]

A carrier of sickle cell is someone of the faulty genes that causes sickle cell disease, but d Its also known as having the sickle cell trait.[2]

People who carry sickle cell wont develop sickle cell diseases, but are at risk of having a child with the condition if their pareant is also carrier.[2]

Sickle-cell crisis
The terms "sickle-cell crisis" may be used to describe several independent acute conditions occurring in patients with SCD. SCD results in anemia and crises that could be of many types including the vaso – occlusive crisis, aplastic crisis, sequestration crisis, haemolytic crisis, and others. Most episodes of sickle-cell crises last between five to seven days. "Although infection, dehydration and acidosis (all of which favor sickling) can act as triggers, in most instances, no predisposing cause was[3] identified".

Haemolytic anemia
Haemolytic anemia is defined as those anemias that result from increase in the rate of red cells destruction. because of action of erythropoietin hyper plasia and anatomical of bone marrow, red cells destruction may be increased several fold before the patient becomes

anemic. compensated hemolytic disease. The normal bone marrow after full expansion is able to produce red cell at 6-8 times the normal rate provided this effective there for hemolytic anemia may not be seen until the red cell life span is less than 30 days it leads to a marked reticulocytosis particularly in the more anemic cases.

The SCD is one of most important type of hemolytic anemia and due to destruction of RBcs in spleen.

Hemolytic crises

Hemolytic crises are acute accelerated drops in hemoglobin level. The red blood cells break down at a faster rate. Management is supportive,[5] sometimes with blood transfusions.

Hepcidin

It is the major hormonal regulator of iron homeostasis, made in the liver it inhibits iron release from macrophages intestinal, epithelial cells and from placental syncytiotrophoblasts by its interaction with the transmembrane.[6] iron exporter ferroportin Accelerating degradation of ferroportin mRNA and increased production of hepcidin, induced by Inflammation via interleukin 6 (IL-6). Hepcidin synthesis and secretion are controlled by proteins HFE hemojuvelin a transferring receptor 2.Decreased production of hepcidin occur in response to iron[7,8,9,10,11] deficiency, hypoxia and ineffective erythropoiesis.

Normal serum hepcidin in adult women 17.286 ng/ml
Normal serum hepcidin in adult man 29.254ng/mls

OBJECTIVE

The purpose of this study was to evaluate serum hepicdin level in Sudanese patients with sickle cell anemia (SS).

Specific objectives

- To find the association between serum hepcidin level and RBcs parameters.
- To correlate serum hepcidin level with age and gender.
- To correlate serum hepcidin level in anemic patients with duration of disease
- To correlate serum hepcidin level with frequency of transfused blood.

MATRIALS AND METHODS

Patients and samples

Study population

A total of 45Sudanese patients with sickle cell anemia admitted to Gafar Ibnoof Pediatric Hospital in Khartoum, during the period from December 2015 to February 2016 were enrolled in this study.

Sample Collection and Serum preparation

Blood samples were collected from patients in plain containers and serum was separated by centrifugation.
Control was done for 20 healthy volunteers matched with sex and age of the patients.

Hepicdin (hepe) level analysis

Serum hepcidin (hepe) was estimated using the commercial ELISA test CDRG stat fax 4200, Germany, the measure range of the assay is 7.5 -150 ug\l, the analytic low level of sensitivity of the DRG ELSA was calculated by subtracting 2 standard deviations from the mean of 20 replicate analyses of the zero standard (50) and was found to be 7.5 ug\l.

Statistical analysis

Data was analyzed by statistical package for social science (SPSS), and Bivirate correlation test, Independent test.

Ethical consideration

This study was approved by the faculty of medical laboratory sciences, Alneelain, University, and informed consents were obtained from each participant before sample collection .

RESULTS

Table 1: Hepcidin level and gender.

	Gender	No	Mean	S.D	Sig	D of Sig
Hepcidin	Male	16	7.5	2.46	0.73	NS
	Female	29	7.2	3.13	0.70-	-NS

Table (1) Showed mean of hepcidin level classified according to gender, the results expressed as (M ± STD).
* P-value < 0.05.

Table 2: Hepcidin level and age.

	Age
Hepcidin Pearson Correlation	0.005-
Sig. (2-) talied	0.972
N	45

r = correlation coefficient
= + positive correlation
- negative correlation
N = number of patients

Table (2) showed the correlation between hepcidin level and age, result expressed as (Pearson's r. P value).
*P value more than 0.05 (insignificant).
*No correlation.

Table 3: Hepcidin level and duration of disease.

	Duration
Hepcidin Pearson Correlation	0.028-
Sig. (2-talied)	0.856
N	45

*P value more than 0.05 (insignificant).
*No correlation.

Table 4: Hepcidin level and hemoglobin.

	Hb
Hepcidin Pearson Correlation	0.839
Sig. (2-talied)	0.000
N	45

*P value more than 0.05 (significant).
*Strong positive correlation.

Table 5: Hepcidin level and PCV.

	PCV
Hepcidin Pearson Correlation.	0.804
Sig. (2-talied)	0.000
N	45

*P value more than 0.05 (significant).
*Strong positive correlation.

Table 6: Hepcidin level and frequencey of blood transfusion.

	Duration
Hepcidin Pearson Correlation.	0.157-
Sig. (2-talied)	0.302
N	45

*P value more than 0.05 (insignificant).
*No correlation.

Table 7: Hepcidin level and RBcs count.

	RBcs
Hepcidin Pearson Correlation	0.693
Sig. (2-talied)	0.000
N	45

*P value more than 0.05 (significant).
*Medium positive correlation.

Table 8: Hepcidin level and RBcs indices (MCV).

	MCV
Hepcidin Pearson correlation	0.094
Sig. (2-talied)	0.537
N	45

*P value more than 0.05 (insignificant).
*No correlation.

Table 9: Hepcidin level and RBcs indices (MCH).

	MCH
Hepcidin Pearson Correlation	0.028
Sig. (2-talied)	0.855
N	45

*P value more than 0.05 (insignificant).
*No correlation.

Table 10: Hepcidin level and RBcs indices (MCHC).

	MCHC
Hepcidin Pearson Correlation	0.290
Sig. (2-talied)	0.053
N	45

*P value more than 0.05 (insignificant).
*No correlation.

Table 11: Mean of hepcidin level in patients with sickle cell anemia and mean of normal range.

	No	Mean	S.D	Sig	D of Sig
Hepcidin	45	7.3	2.9	0.626	NS

* Table (11) showed mean of hepcidin level in patients with sickle cell anemia and the mean of normal range, the results expressed as(M_+ STD).
* Indicate P-value<0.05.

DISSCUTION

Hepcidin is one of most important protein that regulate iron metabolism, and it is regulated by iron status and erythropoietic activity. The present study focused on the level of serum hepcidin in patients with sickle cell anemia result optioned the level of hepcidin has insignificant association with duration of disease but it has medium positive correlation in RBcs count (P-value less than 0.05) and strong positive correlation in hemoglobin and PCV. Due to iron affect in the level of hepcidin. The result showed that no correlation between hepcidin level and RBcs parameters ((P-value more than 0.05).

It was found the level of erythropoietin was significantly decreased in sickle cell anemia, by Fisher (1996).In this study we found that there is a positive correlation between hepcidin level and RBCs number which is in agreement with the same studies done by Serbia (2013). Our results also showed that there was no association between hepcidin level and patients age that agree with Shahidamohsin study 2015.

CONCLUSION

In summary we conclude that there was a significant correlation of serum hepcidin level with RBcs count and hemoglobin, this indicate that hepicdin may play a partial role in the pathogenesis of anemia of sickle cell diseases which need further studies for confirmation.

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