

Evaluation of Serum Heparin Level in Sudanese Patients with Anemia of Chronic Renal Failure

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Abstract

Anemia of chronic renal disease related to the failure of renal excretory functions, and to the renal endocrine function leads to an increased demand for red blood cells. As a consequence of the shortening of the red blood cells life span, failure of renal endocrine function leads to decreased erythropoietic response because of impaired production of erythropoietin.

Heparin is a major hormonal regulator of iron homeostasis. Being synthesized in the liver, it inhibits iron release from macrophages. It could serve as an indicator of functional iron deficiency, in part, with renal failure.

Objective: The purpose of this study is to assess the serum heparin level in Sudanese patients with anemia of chronic renal failure (ACRF).

Materials and methods: A total of 42 patients diagnosed with anemia of chronic renal failure were enrolled in this study. Blood serum was extracted from participants, treated and subjected to ELISA test for the estimation of heparin level.

A total 42 patients diagnosed with ACRF in Sudan, their ages ranged between (13-79) years (mean SD 45 ±20, the mean value of heparin level (13.6) both male 24 (12.7%) and female 18 (14.6%) from different age groups, The heparin level correlated with the duration of disease and with gender (p.value<0.05) the relation of heparin level and age the p.value showed that more than 0.05 insignificant, no association with age.

Conclusion: It was concluded that it has significant correlation of serum heparin level with gender and duration of disease, but no association with RBCs parameters and age.

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Comment [AW2]: What is IT???

Introduction:

Renal failure is a medical condition in which the kidneys fail to adequately filter waste product, from the blood. The two main forms are acute kidney injury, which is often not reversible with any treatment, and chronic kidney disease, which is often not reversible. In both cases, there is usually an underlying cause the kidneys lose their normal function. Anemia of chronic renal disease related to decreased release of iron from macrophages to plasma, reduces red cell life span and an inadequate erythropoietin response occurs, leading to anemia caused by the effects of cytokines such as IL-1 and tumour necrosis factor (TNF) on erythropoiesis.(Sheikh et al., 2006, Xiong et al., 2015).

Hepcidin is a protein and the major hormonal regulator of iron homeostasis, synthesized in the liver (Tesfay et al., 2015). It inhibits iron release from iron; an essential component of the production of red blood cell. Hepcidin is one of the main causes of the disturbances in iron metabolism in renal failure and anemia. The patients with renal failure are usually anemic because of the defect in erythropoiesis (Rubab et al., 2015). Hepcidin that regulates iron homeostasis and could serve as an indicator for functional iron deficiency in portion with renal disease.(Rubab et al., 2015).

macrophage, intestinal epithelial cells and from placental syncytiotrophoblasts, (the outer syncytial layer of the trophoblast that actively invades the uterine wall forming the outermost fetal component of the placenta)by its interaction with the transmembrane iron exporter ferroportin. Accelerating

degradation of ferroportin mRNA, increased production of hepcidin is induced by inflammation, via interleukin 6 (IL-6). Hepcidin synthesis and secretion are controlled by proteins, HFE hemojuvelin and transferrin receptor 2. Decreased production of hepcidin occurs in response to iron deficiency, hypoxia and ineffective erythropoiesis.(Casanovas et al., 2009, McCranor et al., 2013)

Renal failure is a public health problem and the major complications in renal failure patient have several abnormalities in the systemic homeostasis of

Objective:

The purpose of this study is to evaluate serum hepcidin level in Sudanese patients with anemia of chronic renal failure.

Materials and methods

Study population

A total of 42 Sudanese patients with anemia of CRF, (Chronic Renal Failure), were enrolled in this study and admitted to renal hemodialysis center in Khartoum Bahri, during

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the period from April to May 2015.

Sample collection and serum preparation

Blood samples were collected from patients in plain containers and the serum was prepared by centrifugation.

Hepcidin Hepcidin (hepc) level analysis

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

Statistical analysis

Data of this study was analyzed by statistical package for social sciences (SPSS), correlation between serum hepcidin level variants and qualitative variables were tested by cross tabulation and chi-square test, means of age

and duration were compared by test.

Ethical consideration

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

Results

A total of 42 patients diagnosed with anemia of chronic renal failure, whose age ranged between (16-79) years mean \pm SD (45 \pm 20), were enrolled.

The mean value of hepcidin level (13-6%) both male 24 (12.7%) and female 18 (14.6%)(fig 1) from different age groups showed the mean value in age less than 20, 16 individuals (14.3%) less than 40 years 42 individuals (38.1%), and more than 40 years 42 individuals (47.6%)(fig 2) the result was showed the correlation of hepcidin level and duration of disease(fig 4) , the main value 53.890(p-value less than 0.05).

Table-1 they have different mean value of hepcidin according to correlation of RBcs parameter pcv (13.8), RBcs count (16.531), MCH(16.57), MCHC(19-393) and MCV (76.6), table.3 the result showed the mean of hepcidin level classified according to gender p.value<0.05) indicating correlation with gender (table-1). The relation of hepcidin level and age the p.value of more than 0.05 (insignificant) showed , so no association with age, (table 2).

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Gender	Hepcidin level			
	frequency	mean	S.D	Dofsig
male	24	12.7	15.8	NS
female	18	14.6	20.9	

Table 1. The mean value of hepcidin level related to gender
S.D –standard deviation, .D of sig -degree of significant

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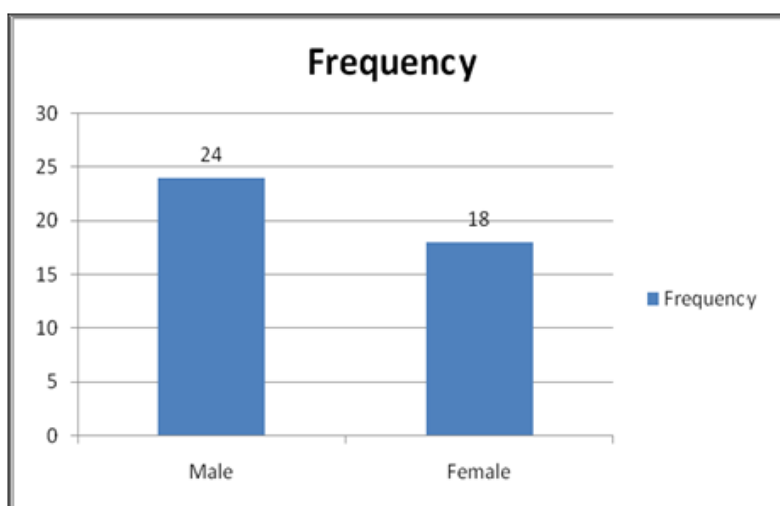


Fig 1. Showed the mean value of hepcidin level related with gender

Table 2. The mean value of hepcidin level related to age

Age	percentage	frequency	p.value
0-20	14.3%	6	0.781
21>40	38.1%	16	
>40	47.6%	20	

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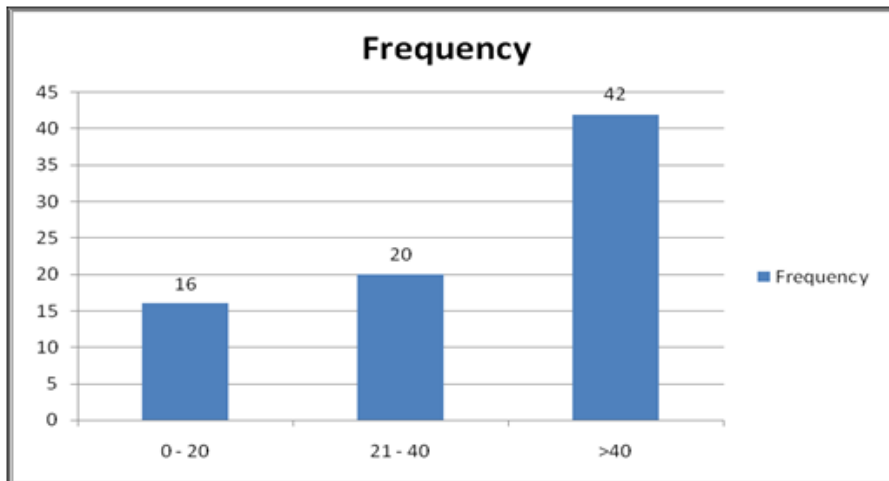


Fig 2. Showed the frequency of hepcidin level and age
Table 3. The hepcidin level related with RBcs parameters

Variable	Hb	PCV	RBCs	MCH	MCHC	MCV
Mean	4.5	13.8	10.531	16.576	19..393	76.6
p.value	0.10	0.11	0.16	0.89	0.31	0.54

PCV – packed cell volume, RBCs – red blood cells, Hb- Hemoglobin, MCH- median concentration of hemoglobin: MCHC- median cell hemoglobin concentration: MCV – median cell volume.

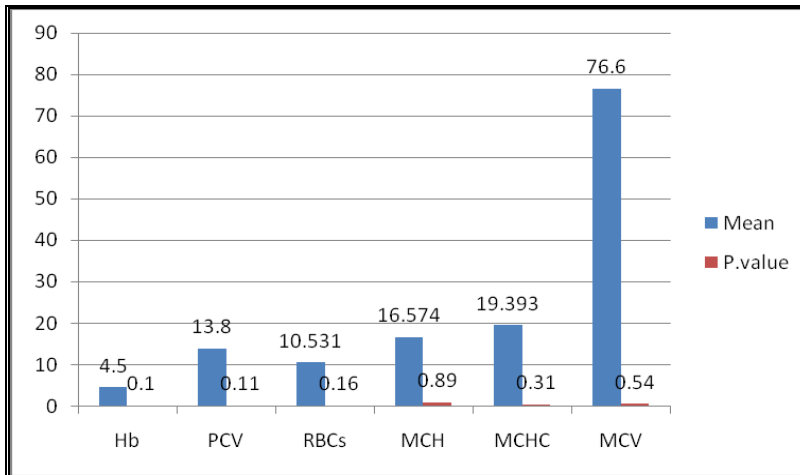


Fig 3.Shows the hepcidin level related with Rbc's parameters
Table 4.The hepcidin level related with duration

Variable	Duration
Mean	53.9
p.value	0.04

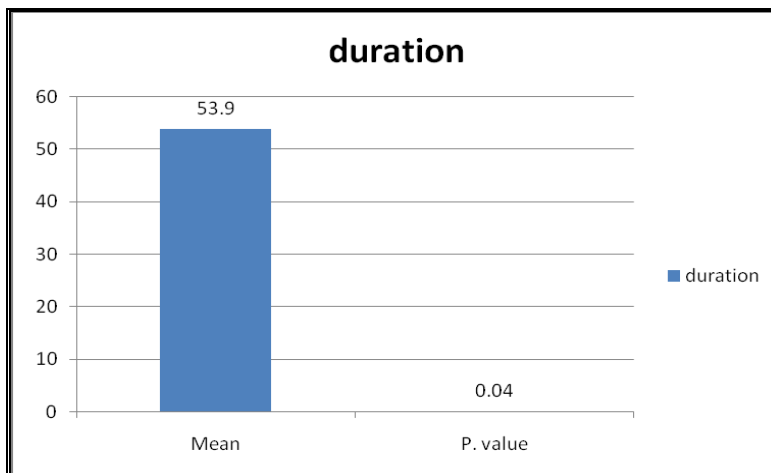


Fig 4. Showed the hepcidin level related with duration

Discussion:

Hepcidin is one of most important proteins 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 ACRF. In our study we used the enzyme-linked immunosorbent assay (ELISA) method for the levels detection and found that the levels were significantly lower in patients with first stage of hemodialyzed due to anemia, and then increase in the end stage of renal anemia due to inflammation. These evaluated levels in hemodialyzed patients could be due to functional iron deficiency anemia and low grade inflammation. the result showed that the level of hepcidin in female (14.6) more than male (12.7%) due to more demand for iron that means significant associated between hepcidin level and gender, $p.value < 0.05$.

The result obtained the level of hepcidin has significant associated with duration of disease but it has a weak positive correlation (p -value less than 0.05). That is due to increase severity of renal disease lead to abnormalities in systemic homeostasis of iron and affect in the level of hepcidin that is main causes of the disturbances in iron metabolism.

The result showed that no correlation between hepcidin level and RBcs parameters (fig 4) (p -value more than 0.05), it has insignificant relation.

That RBcs parameters can affect by levels of hepcidin this finding disagrees with study done by Institute of Transfusiology, Serbia (2013) which showed A significant positive correlation between RBcs number and hepcidin level, The present study agrees with the study done by Shahida Mohsin (2015), who showed that there was no association between patients hepcidin level and their age.

Acknowledgement:

By the grace of Almighty Allah and his help I completed this study; all praise to him, mygratitude goes to Dr. Enaam A. Rhman, my supervisor whoguided me upto completion of this work. All appreciation goesto the staff of Haematology Department (Alneelain University).

Finally special thanks to patients who were so cooperative, despite their pains and ailments.

Conclusions:

In summary we conclude that serum hepcidin level has significant correlation with gender and duration of disease, but has no association with RBcs parameters and age. This work needs a deeper study using different stages of renal failure.

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