EVALUATION OF SERUM HEPCIDIN LEVEL IN SUDANESE PATIENTS WITH ANEMIA OF CHRONIC RENAL FAILURE

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INTRODUCTION

Renal failure is a medical condition in which the kidneys fail to adequate filter waste production, from the blood. The two main forms is acute kidney injury, which is often not reversible with adequate treatment, and chronic kidneys disease, which is often not reversible. In both cases, there is usually an underlying cause the kidneys lose its normal function. Anemia of chronic renal disease related to decreased release of iron from macrophages to plasma, reduced red cell life span and an inadequate erythropoietin response to anemia caused by the effects of cytokines such as IL-1 and tumour necrosis factor (TNF) on erythropoiesis. (Sheik et al., 2006, Xiong et al., 2015) Hepcidin is a protein and the major hormonal regulator of iron homeostasis, made in the liver (Tesfay et al., 2015), it inhibits iron release from macrophage, intestinal epithelial cells and from placental syncytiotrophoblasts by its interaction with the trans membrane iron exporter ferroportin.

Accelerating degradation of ferroportion mRNA increased production of hepcidin in is induced by inflammation, via interleukin 6(IL- 6) hepcidin in synthesis and secretion are controlled by proteins, HFE hemojuelin and transferrin receptor 2, decreased production of hepcidinoccurs in response to iron deficiency, hypoxia and ineffective erythropoiesis. (Casanovas et al., 2009, McCranor et al., 2013) Renal failure is apublic health problem is the major complications in renal failure patient have scueral abnormalities in systemic homeostasis of 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 patient with renal failure are usually anemic because of defect in erythropoiesis (Rubab et al., 2015), hepcidin that regulates iron homeostasis and could be serve as an indicator of functional iron deficiency in portion with renal disease. (Rubab et al., 2015)

Objective

The purpose of this study was to evaluate serum hepcidin level in Sudanese patients with anemia of chronic renal failure.
MATERIALS AND METHODS

Patients and samples

Study population

A total 42 Sudanese patients with anemia of CRF admitted to renal hemodialysis center in Khartoum Bahri, during the period from April to May 2015 were enrolled in this study.

Sample collection and serum preparation

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

Hepcidin (hepc) level analysis

Serum hepcidin (hepc) was estimated using the commercial ELISA test 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 was calculated by subtracting 2 standard deviations from the mean of 20 replicate analyses of the zero standard (50) and was found to be 7.5ug/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 crosstablation and chi-square test, means of age and duration were compared by anova test.

Ethical consideration

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

RESULTS

A total of 42 patients diagnosed with anemia of chronic renal failure their age ranged between (16-79) years mean ±SD (45±20). 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 4 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 indicate to correlation with gender (Table 1). The relation of hepcidin level and age the p.value showed that more than 0.05 insignificant, no association with age Table 2.

Table 1. The mean value of hepcidin level related to gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Hepcidin level</th>
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<tbody>
<tr>
<td></td>
<td>frequency mean S.D Dofsig</td>
</tr>
<tr>
<td>male</td>
<td>24  12.7  15.8 NS</td>
</tr>
<tr>
<td>female</td>
<td>18  14.6  20.9</td>
</tr>
</tbody>
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S.D –standard deviation, D of sig -degree of significant
Hepcidin is one of most important protein that regulate of 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 detection levels and found that the levels were significantly lower in patients with first stage of hemodialyzed due to anemia, and then increase in 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 to iron that means significant associated between hepcidin level and gender, p.value<0.05.

The result optined the level of hepcidin has significant assoiated with duration of disease but it has week positive correlation (p-value less than 0.05) 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 is disagree with study done by institute of transfusiology, Serbia (2013) which showed A significant positive correlation between RBcs number and hepcidin level. The present study agree with study done by shahidamohsin (2015), which showed that there was no association between patients hepcidin level and their age.

**Table 4. The hepcidin level related with duration**

<table>
<thead>
<tr>
<th>Variable</th>
<th>duration</th>
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<tbody>
<tr>
<td>Mean</td>
<td>53.9</td>
</tr>
<tr>
<td>p.value</td>
<td>0.04</td>
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**Fig. 4. Showed the hepcidin level related with duration**

**DISCUSSION**

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

**Acknowledgement**

By the grace of Almighty Alla and his help I completed this study; all praise to him, my gratitude goes to Dr. Enaam A. Rhman, my supervisor who guides me to complete this work, all appreciation to the staff of Haematology Department (Alneelain University). Finally special thanks to patients who were so cooperative and despite their pain.

**REFERENCES**


