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RESEARCH ARTICLE

THE ROLE OF HEPCIDIN LEVEL IN DEVELOPMENT OF ANAEMIA AMONG DIABETIC SUDANES PATIANT IN KHARTOM STATE AT 2015

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ABSTRACT

Background: Hepcidin is a 20–, 22–, or 25–aminoacid peptide hormone, produced in the liver and detectable in serum and urine, Hepcidin controls plasma iron concentration and its increases in response to inflammatory stimuli (Weinstein *et al*., 2002; Nemeth & Ganz 2006). Diabetes mellitus Is a group of related diseases in which the body cannot regulate the amount of glucose in the blood, Diabetes-related chronic hyperglycemia can lead to a hypoxic environment in the renal interstitium, which results in impaired production of erythropoietin (Singh *et al*., 2009). Anemia of chronic disease is reflecting a reduction in red blood cell (RBC) production by the bone marrow, with a component due to mild shortening of RBC survival. A number of factors contribute to this hypoproliferative state. (Papadaki *et al*., 2002; Weinstein *et al*., 2002)

Objective: The purpose of this study was to evaluate the Role of Hepcidin Level in Development of Anemia among Diabetic Sudanese Patient in Khartoum state.

Materials and Methods: A total 42 patinets diagnosed with Diabetes and anemia enrolled in this study, serum was separated from participants for ELISA, to estimate hepcidin level.

Results: A total 42 patients diagnosed with anemia and Diabetes, their ages ranged between (13-79) years (mean SD 45 $\pm$ 20, the mean value of hepcidin level (13.6) both male 24 (12.7%) and female 18 (14.6%) from different age groups. The mean value of blood Glucose (79.066). The hepcidin level showed correlate with duration of disease and with gender (p.value <0.05) the relation of hepicdin level.

Conclusion: In summary, we conclude that serum hepcidin level has significant correlation with gender and duration of disease, so it is manly work as acute phase protein prapotinal with duration, but has no association with RBcs parameters, DM and age

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INTRODUCTION

Hepcidin is a 20–, 22–, or 25–aminoacid peptide hormone, produced in the liver and detectable in serum and urine. Hepcidin its expression increases in response to inflammatory stimuli, hepcidin develop severe iron deficiency anaemia. Together, Synthesis of hepcidin is homeostatically increased by iron loading and decreased by anemia and hypoxia. Hepcidin is also elevated during infections and inflammation, causing a decrease in serum iron levels and contributing to the development of anemia of inflammation, Hepcidin controls plasma iron concentration and tissue distribution of iron by inhibiting intestinal iron absorption, iron recycling by macrophages, and iron mobilization from hepatic stores, is also considered as one of the acute phase proteins believed that this effect can lead to anemia of chronic disease, which is caused by a decrease of circulating iron available for erythropoiesis, despite normal iron stores, The hepcidin level increases in patients with CRF and hemodialysis.(Weinstein *et al*., 2002; Nemeth & Ganz 2006)

Diabetes mellitus is a group of related diseases in which the body can not regulate the amount of sugar, glucose in the blood. blood glucose level is regulated by Insulin, Insulin is produced by the pancreas, People with diabetes either do not produce enough insulin (type 1 diabetes) or cannot use insulin properly (type 2 diabetes), or both, Diabetes-related chronic hyperglycemia can lead to a hypoxic environment in the renal interstitium, which results in impaired production of erythropoietin (Papadaki *et al*., 2002; Roy 2010). The anemia of chronic disease (ACD, also called anemia of chronic inflammation), was initially associated primarily with

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infectious, inflammatory, or neoplastic disease. Other including severe trauma, diabetes mellitus, anemia of older adults, and in those with acute or chronic immune activation.(Cash & Sears 1989; Price & Schrier 2010), The anemia is typically normochromic, normocytic, and mild in degree. ACD is reflecting a reduction in red blood cells (RBC) production by the bone marrow, with a component due to mild shortening of RBC survival. A number of factors are thought to contribute to this hypoproliferative state. (Means & Krantz 1992; Roy 2010) Hepcidin-induced alterations in iron metabolism, including reduced absorption of iron from the gastrointestinal tract and trapping of iron in macrophages. This results in reduced plasma iron levels (hypoferremia), making iron unavailable for new hemoglobin synthesis (Theurl *et al*., 2006; Means 1999) .Inability to increase erythropoiesis in response to anemia. Serum erythropoietin (EPO) levels are somewhat elevated in ACD, but there is virtually no increase in erythropoiesis, perhaps due to increased apoptotic death of red cell precursors within the bone marrow. (Schilling 1991; Means 1999; Papadaki *et al*., 2002; Means & Krantz 1992)

Objective

The purpose of this study was to study The Role of Hepcidin Level in Development of Anemia among Diabetic Sudanese Patient in Khartoum state.

MATERIALS AND METHODS

Patients and samples

Study population

A total 42 Diabetic Sudanese patients admitted to Diabetic center in Khartoum, during the period from Apirl to May 2015 were enrolled in this study.

Sample collection and serum prepration

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

Hepicdin (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 -150 ug/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.

Statictical analysis

Data of this study was analyze by statistical package for social sciences (SPSS), correlation between serum hepicdin level variants and qualitative variables were tested by crosstablatien 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 Diabetic patients diagnosed where 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%) 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%), 42 individuals mean value of blood Glucose (79.066) (Table 1). The result was showed the correlation of hepcidin level and duration of disease, the main value 53.890 (p-value less than 0.05). (Table 3) they have different mean value of hepcidin according to correlation of RBcs parameter pcv (13.8), (Table 3) RBcs count (16.531), MCH (16.57), MCHC (19-393)and MCV (76.6), Table 2 the result showed the mean of hepcidin level classified according to gender p.value <0.05) indicate to correlation with gender (Table 2).

The relation of hepicdin level and age the p.value showed that more than 0.05 insignificant, no association with age (Table 1).

Table 1. The hepcidin level related with duration and glucose

	Glucose	Duration
Mean	79.066	53.9
p.value	0.16	o.04

Table 2. The mean value of hepcidin level releated to gender

Gender	Hepcidin level			
Male	Frequency	Mean	S.D	D of sig
	24	12.7	15.8	NS
Female	18	14.6	20.9	

S.D –standard deviation, .D of sig -degree of significant

Table 3. The hepcidin level related with,RBcs parameters

Variable	Hb	pcv	RBcs	MCH	MCHC	MCV
Mean	4.5	13.8	10.531	16.574	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

Table 4. The mean value of hepcidin level related to age

Age	Percentage	Frequency	p.value
0-20	14.3%	16	0.781
21>40	38.1%	20	
>40	47.6%	42	

DISCUSSION

Hepcidin is act as acute phase protein due to chronic inflammation related to diabetes mellitus and play main role to regulate iron metabolism. In This study we used the enzyme-linked immunosorbent assay (ELISA) method for the detection levels and found that the levels were significantly lower in patients D.M, the result showed that the level of hepicidin 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 level of hepcidin has significant associated with duration of disease but it has week positive correlation (p-value less than 0.05) due to chronic inflammation by action of DM affect in the level of hepcidin that is main causes of the disturbances in iron metabolism.

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

The duration of DM can affect the hepicdin levels this finding with is agree with study done by Saliba and Lee (2012) which showed that there was association between hepicdin levels and duration.

Conclusion

In summary, we conclude that serum hepcidin level has significant correlation with gender and duration of disease, so it is manly work as acute phase protein prapotinal with duration, but has no association with RBcs parameters, DM and age.

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REFERENCES

Cash, J.M. & Sears, D.A., 1989. The anemia of chronic disease: spectrum of associated diseases in a series of unselected hospitalized patients. The American journal of medicine, 87(6), pp.638–44. Available at: http://www.ncbi.nlm.nih.gov/pubmed/2589399 [Accessed August 10, 2015].

Means, R.T., 1999. Advances in the anemia of chronic disease. International journal of hematology, 70(1), pp.7–12. Available at: http://www.ncbi.nlm.nih.gov/pubmed/10446488 [Accessed August 10, 2015].

Means, R.T. & Krantz, S.B., 1992. Progress in understanding the pathogenesis of the anemia of chronic disease. Blood, 80(7), pp.1639–47. Available at: http://www.ncbi.nlm.nih.gov/pubmed/1391934 [Accessed August 10, 2015].

Nemeth, E. & Ganz, T., 2006. Regulation of iron metabolism by hepcidin. Annual review of nutrition, 26, pp.323–42. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16848710 [Accessed February 28, 2015].

Papadaki, H.A. *et al*., 2002. Anemia of chronic disease in rheumatoid arthritis is associated with increased apoptosis of bone marrow erythroid cells: improvement following anti-tumor necrosis factor-alpha antibody therapy. Blood, 100(2), pp.474–82. Available at: http://www.ncbi.nlm.nih.gov/pubmed/12091338 [Accessed August 10, 2015].

Price, E.A. & Schrier, S.L., 2010. Unexplained aspects of anemia of inflammation. Advances in hematology, 2010, p.508739. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2846342&tool=pmcentrez&rendertype=abstract [Accessed August 10, 2015].

Roy, C.N., 2010. Anemia of inflammation. Hematology / the Education Program of the American Society of Hematology. American Society of Hematology. Education Program, 2010, pp.276–80. Available at: http://www.ncbi.nlm.nih.gov/pubmed/21239806 [Accessed August 10, 2015].

Schilling, R.F., 1991. Anemia of chronic disease: a misnomer. Annals of internal medicine, 115(7), pp.572–3. Available at: http://www.ncbi.nlm.nih.gov/pubmed/1883128 [Accessed August 10, 2015].

Singh, D.K., Winocour, P. & Farrington, K., 2009. Erythropoietic stress and anemia in diabetes mellitus. Nature reviews. Endocrinology, 5(4), pp.204–10. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19352318 [Accessed August 10, 2015].

Theurl, I. *et al*. 2006. Dysregulated monocyte iron homeostasis and erythropoietin formation in patients with anemia of chronic disease. Blood, 107(10), pp.4142–8. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16434484 [Accessed August 10, 2015].

Weinstein, D. a. *et al*., 2002. Inappropriate expression of hepcidin is associated with iron refractory anemia: Implications for the anemia of chronic disease. Blood, 100(10), pp.3776–3781.

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