بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

Role of Hepcidin as a biomarker for iron status in patients on regular hemodialysis after treatment of hepatitis C virus

A Thesis

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in **Internal Medicine**

By

Mohamed Adel Sharaf

M.B., B.Ch

Nephrology Resident at Nasser Institute for Treatment and Research

Under Supervision of

Prof. Dr. Magdy Mohamed El Sharkawy

Professor of Internal Medicine and Nephrology
Faculty of Medicine, Ain Shams University

Dr. Haitham Ezzat Abdelaziz

Assistant Professor of Internal Medicine and Nephrology
Faculty of Medicine, Ain Shams University

Dr. Lina Essam Khedr

Lecturer of Internal Medicine and Nephrology
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
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إلا ما علمتنا إنك أنت
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Mohamed Adel Sharaf
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List of Abbreviations

Abbr.	Full-term
ADPKD	**:** Autosomal dominant polycystic kidney disease
AI	**:** Anemia of inflammation
AKI	**:** Acute kidney injury
AVF	**:** Arteriovenus fistula
CHC	**:** Chronic hepatitis C
CKD	**:** Chronic kidney disease
COPD	**:** Chronic obstructive pulmonary disease
CPN	**:** Chronic pyelonephritis
CRRT	**:** Continuous renal replacement therapy
DAAs	**:** Direct acting antivirals
DM	**:** Diabetes Mellitus
eGFR	**:** Estimated glomerular filtration rate
ESA	**:** Erythropoiesis-Stimulating Agent
ESRD	**:** End stage renal disease
GIT	**:** Gastrointestinal tract
HAMP	**:** Hepcidin Antimicrobial Peptide
HB	**:** Heamoglobin
HCC	**:** Hepatocellular carcinoma
hCT	**:** Hematocrite value
HCV	**:** Hepatitis C virus
HD	**:** Heamodialysis
HH	**:** Hereditary Hemochromatosis
HJV	**:** Hemojuvelin
IDA	**:** Iron deficiency anemia
IFN	**:** Interferon

IHD : Ischemic heart disease
IL-6 : Interleukin-6
IRES : Internal ribosome entry site
KTx : Kidney transplant
LEAP-1 : Liver- Expressed Antimicrobial Protein-1
LPS : Lipopolysaccharide
MHD : Maintenance hemodialysis
NSAID : Non-steroidal anti-inflammatory drugs
OCI : Occult hepatitis C virus infection
PD : Peritoneal dialysis
PIH : Pregnancy induced hypertension
PMNCs : Polymorph nuclear cells
rhEPO : Recombinant human erythropoietin
RRT : Renal replacement therapy
SD : Standard deviation
SLE : Systemic lupus erthymatosis
SPSS : Statistical package for social science
SVR : Sustained virologic response
TfR2 : Transferrin Receptor 2
TIBC : Total iron binding capacity
TIN : Tubulointerstitial nephritis
TSAT : Transferrin percentage saturation

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Abstract

Background: Hepcidin, an acute phase reactant protein produced in the liver, is a key regulator of iron homeostasis. Because of its renal elimination and regulation by inflammation, it is possible that progressive renal insufficiency leads to altered hepcidin metabolism. **Aim of the Work:** to assess effect of HCV treatment on hepcidin levels in regular heamodialysis patients and its relation to iron status. **Patients and Methods:** This cross sectional study was conducted on 45 ESRD patients on regular hemodialysis. All candidates included in this study subjected to careful history taking, full clinical examination and investigations (including complete blood count, HCVAb, HBVsAg and HIVAb). **Results:** In our study, dry weight ranged from 46 to 117 kg with mean 77.36. Weight gain ranged from 2 to 5 kg with mean 3.09.About 87% of patients had LTAVF access. About 12 patients (27%) received blood transfusion once. Timing of transfusion ranged from 4 to 60 month with median of 24 months. Regarding frequency of epoetin dose, 11 patients (24.4%) did not receive epoetin, 16 patients (35.6%) received it twice/week. Only 3 patients (6.7%) received iron therapy for time ranging from 3 to 5 months with mean of 4 months. Mean Hb concentration in our study population was 10.11 ±1.64 gm/dl. The mean of iron was 64.22 ±19.52, TIBC was 409.96 ± 67.85, ferritin was 394.56 ± 239.22 and TSAT% was 22.6 ±7.36. The mean serum hepcidin was 218.51 ±127. Our study demonstrated that increase in serum hepcidin is associated with lower serum Hb and iron levels. On the other hand, there is statistically significant positive correlation between serum hepcidin and both serum ferritin and transferrin saturation. **Conclusion:** Median hepcidin value is elevated in dialysis ESRD patients due to increased inflammation and decreased clearance of hepcidin. Also serum hepcidin levels were lowered in HCV patients. Therefore ESRD patients on maintenance HD after treatment of HCV infection showed elevated levels of serum hepcidin.

Key words: Hepcidin, iron status, regular hemodialysis, hepatitis C virus

Introduction

Anemia is an important and common problem associated with chronic kidney disease (CKD), which is caused by erythropoietin deficiency, iron-restricted erythropoiesis ***(Ueda & Takasawa, 2017).***

Adequate iron stores are essential for achieving maximum benefit from erythropoietic agents, such as recombinant human erythropoietin (rhEPO). Decreased iron stores or decreased availability of iron are the most common reasons for resistance to the effect of these agents ***(Weiler et al., 2015).***

Ferritin is a marker of tissue iron stores, whereas TSAT is a marker of iron available for erythropoiesis in the circulation. TSAT is calculated as follows: (serum ferritin/ total iron binding capacity)´100. Absolute or true IDA is present when the body iron stores are low and usually is represented by ferritin levels less than 100 ng/mL in predialysis and peritoneal dialysis patients and by ferritin levels less than 200 ng/mL in hemodialysis patients and a TSAT less than 20% ***(Rocha et al., 2009).***

Hepcidin, an acute phase reactant protein produced in the liver, is a key regulator of iron homeostasis. Hepcidin inhibits intestinal iron absorption and iron release from macrophages and hepatocytes. Because hepcidin productions