



بسم الله الرحمن الرحيم

∞∞∞∞

تم رفع هذه الرسالة بواسطة / سامية زكى يوسف

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى

مسئولية عن محتوى هذه الرسالة.

ملاحظات: لا يوجد





**Serum Ferritin and cellular reactive protein (CRP)
in non alcoholic Fatty liver disease(NAFLD) and
non alcoholic steatohepatitis(NASH) patients**

Thesis

Submitted for Partial Fulfillment of Master Degree
In Gastroenterology and Hepatology

By

Mai Aboelkheir Awad Mohammed Dabiesh
(M.B.,B.Ch.) Faculty of Medicine, Ain Shams University

Supervised by

Prof. Dr. Amira Ahmed Salem

Professor of Internal Medicine
Faculty of Medicine - Ain Shams University

Prof. Dr. Khaled Hamdy Abdelmageed

Professor of Internal Medicine
Faculty of Medicine - Ain shams University

Dr. Mohamed Nabil Badawy

Lecturer of Internal Medicine
Faculty of Medicine - Ain shams University

Faculty of Medicine
Ain Shams University

2022

Acknowledgement

First of all, all gratitude is due to Allah almighty for blessing this work, until it has reached its end, as a part of his generous help, throughout my life.

Really I can hardly find the words to express my gratitude to Prof. Dr. Amera Ahmed Salem, Professor of Internal Medicine, Gastroenterology, Faculty of Medicine – Ain Shams University, for her supervision, continuous help, encouragement throughout this work and tremendous effort she has done in the meticulous revision of the whole work. It is a great honor to work under her guidance and supervision.

I would like also to express my sincere appreciation and gratitude to Prof. Dr. Khaled Hamdy Abdelmageed, Professor of Internal Medicine, Gastroenterology, Faculty of Medicine – Ain Shams University, for his continuous directions and support throughout the whole work.

I cannot forget the great help of Dr. Mohammed Nabil Badawy, Lecturer of Internal Medicine, Gastroenterology, Faculty of Medicine – Ain Shams University, for his invaluable efforts, tireless guidance and for his patience and support to get this work into light.

Last but not least, I dedicate this work to my family, whom without their sincere emotional support, pushing me forward this work would not have ever been completed.

Mai Abou Elkheir Dabiesh

List of Contents

Title	Page
▪ List of Abbreviations.....	I
▪ List of Tables.....	II
▪ List of Figures	V
▪ Introduction.....	1
▪ Aim of the Study.....	3
▪ Review of Literature	
- NAFL	4
- Ferritin	9
- CRP	13
- NASH.....	15
▪ Patients and Methods	36
▪ Results	47
▪ Discussion	76
▪ Summary	85
▪ Conclusion	89
▪ Recommendations	90
▪ References.....	91
▪ Arabic Summary.....	--

List of Abbreviations

Abb.	Full-term
AST	Aminotransferase, Aspartate
BMI	Body Mass Index
CBC	Complete Blood Count
CCL-2	CC-Chemokine Ligand 2
CRP	Cellular Reactive Protein
ELF	Enhanced Liver Fibrosis
H.S	Highly Significant
HA	Hyaluronic Acid
HOMA-IR	Homeostasis Model Assessment of Insulin Resistance
IL-6	Interleukin-6
LDL	Low Density Lipoprotein
N.S	Non-Significant
NAFLD	Nonalcoholic Fatty Liver Disease
NASH	Non Alcoholic Steatohepatitis
SF	Serum Ferritin
Sig	Significant
SPSS	Statistical Package for Social Sciences
TNF-α	Tumor Necrosis Factor Alpha
U.S	United States
U/S	Ultrasound
VLDL	Very Low Density Lipoprotein

List of Tables

Table No.	Title	Page
Table (1):	Comparison between the studied groups	48
Table (2):	Comparison between both groups as regard diabetes mellitus (DM)	49
Table (3):	Comparison between both groups as regard abdominal ultrasound	50
Table (4):	Comparison between both groups as regard age	51
Table (5):	Comparison between both groups as regard body mass index (BMI)	52
Table (6):	Comparison between both groups as regard haemoglobin (Hb)	53
Table (7):	Comparison between both groups as regard platelets	54
Table (8):	Comparison between both groups as regard ALT level	55
Table (9):	Comparison between both groups as regard AST level	56
Table (10):	Comparison between both groups as regard albumin	57
Table (11):	Comparison between both groups as regard CRP.....	58
Table (12):	Comparison between both groups as regard fasting blood sugar (FBS).....	59

List of Tables (Continued)

Table No.	Title	Page
Table (13):	Comparison between both groups as regard ferritin.....	60
Table (14):	Comparison between both groups as regard LDL	61
Table (15):	Comparison between both groups as regard HDL	62
Table (16):	Comparison between both groups as regard cholesterol.....	63
Table (17):	Comparison between both groups as regard triglycerides.....	64
Table (18):	Comparison between both groups as regard NAFLD fibrosis score	65
Table (19):	Comparison between Ferritin level and mild, moderate, sever degree of abdominal ultrasound in both groups	66
Table (20):	Comparison between Ferritin level and gender in both groups	66
Table (21):	Comparison between Ferritin level and diabetes mellitus in both groups...	67
Table (22):	Correlation between ferritin and other variables in both groups	68
Table (23):	Comparison between CRP level and mild, moderate, sever degree of abdominal ultrasound in both groups ..	70

List of Tables (Continued)

Table No.	Title	Page
Table (24):	Comparison between CRP level and gender in both groups	71
Table (25):	Comparison between CRP level and diabetes mellitus in both groups.....	71
Table (26):	Correlation between CRP and other variables in both groups	72
Table (27):	ROC curve between Group A and Group B	74

List of Figures

Figure No.	Title	Page
Fig. (1):	Mallory-Denk body	16
Fig. (2):	Ballooning degeneration	17
Fig. (3):	NASH (inflammation) and fibrosis stage 1	17
Fig. (4):	NASH (inflammation) and fibrosis stage 2 ..	18
Fig. (5):	Lobular inflammation	18
Fig. (6):	NASH pathogenesis	19
Fig. (7):	non alcoholic fatty liver disease treatment method	20
Fig. (8):	Bariatric_surgery_in_NAFLD.....	28
Fig. (9):	Comparison between both groups as regard gender there is no significant difference. Group A 50% male and 50% female, Group B 45% male and 55 % female	48
Fig. (10):	Comparison between both groups as regard diabetes mellitus (DM), group A 100% non-diabetic and group B 75% non-diabetic and 25% diabetic with significant difference between both groups.....	49
Fig. (11):	Comparison between both groups as regard abdominal ultrasound, mild group A 75%, group B 35% and moderate group A 15%, group B 25% and sever group A 10%, group B 40% with significant difference between both groups	50

List of Figures (Continued)

Figure No.	Title	Page
Fig. (12):	Comparison between both groups as regard age there is no significant difference between both groups	51
Fig. (13):	Comparison between both groups as regard body mass index (BMI) there is no significant difference between both groups.....	52
Fig. (14):	Comparison between both groups as regard haemoglobin (Hb) there is no significant difference between both groups	53
Fig. (15):	Comparison between both groups as regard platelets there is no significant difference between both groups	54
Fig. (16):	Comparison between both groups as regard ALT level there is no significant difference between both groups	55
Fig. (17):	Comparison between both groups as regard AST level there is no significant difference between both groups	56
Fig. (18):	Comparison between both groups as regard albumin there is no significant difference between both groups.....	57
Fig. (19):	Comparison between both groups as regard CRP there is no significant difference between both groups	58

List of Figures

Figure No.	Title	Page
Fig. (20):	Comparison between both groups as regard fasting blood sugar (FBS) there is significant difference between both groups	59
Fig. (21):	Comparison between both groups as regard ferritin there is significant difference between both groups	60
Fig. (22):	Comparison between both groups as regard LDL there is significant difference between both groups	61
Fig. (23):	Comparison between both groups as regard HDL there is no significant difference between both groups	62
Fig. (24):	Comparison between both groups as regard cholesterole there is significant difference between both groups	63
Fig. (25):	Comparison between both groups as regard triglycerides there is no significant difference between both groups	64
Fig. (26):	Comparison between both groups as regard NAFLD fibrosis score there is significant difference between both group	65
Fig. (27):	Sensitivity and specificity of ferritin	74
Fig. (28):	Sensitivity and specificity of CRP	74

List of Figures

Figure No.	Title	Page
Fig. (29):	Sensitivity and specificity of ferritin and CRP.....	75

INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) is now recognized as the most common cause of liver disease and may be present in up to 20% of the U.S. population.

Serum ferritin (SF) levels are commonly elevated in patients with nonalcoholic fatty liver disease (NAFLD) because of systemic inflammation, increased iron stores, or both.

However, ferritin is also an acute-phase protein and can also be induced in the setting of systemic inflammation^[1].

Expression of ferritin, the primary tissue iron-storage protein in the liver, where most extra body iron is stored, is induced in primary or secondary iron overload disorders, resulting in increased hepatic and circulating ferritin levels^[2].

Serum ferritin is an important inflammatory disease marker, as it is mainly a leakage product from damaged cells^[3].

Recent data suggests that excess iron induces vascular damage by increasing levels of the hormone hepcidin, which would determine iron trapping into macrophages, oxidative stress, and promotion of transformation into foam cells.

-Introduction-

Elevation of serum ferritin may occur in hereditary hemochromatosis, inflammation, liver disease caused by hepatitis B and C virus, and alcoholic liver disease^[4].

Serum ferritin is a discriminant marker for both fibrosis and inflammation in histologically proven non-alcoholic fatty liver disease patients^[5].

AIM OF THE STUDY

To study the relation between serum ferritin and CRP levels and severity of non-alcoholic fatty liver disease NAFLD and non-alcoholic steatohepatitis NASH.