

hossam maghraby



بسم الله الرحمن الرحيم



hossam maghraby



شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



hossam maghraby



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



hossam maghraby



شبكة المعلومات الجامعية



بعض الوثائق الأصلية تالفة



hossam maghraby



بالرسالة صفحات
لم ترد بالأصل



B19277

Study of some oxidative parameters in patients with iron deficiency anemia

Thesis

Submitted to Medical Research Institute

*In partial fulfillment of
Master Degree*

*In
Chemical Pathology*

By

Aayat Mohamed Abdel Mageed

M.B.B.Ch.

وأجبت اللجنة على قبول الرسالة بتقدير ممتاز (97%) مع التوصية

في المذاكرة

Alexandria University

2004

تم المناقشة علنياً
يوم ١٧ / ٢ / ٢٠٠٤
بمقر المعهد

صلى الله عليه وسلم

د. طارق

د. محمد

Supervisors

Prof. Dr. Mona M. Abaza

Professor of chemical pathology

Medical Research Institute

Alexandria University

Dr. Yosri Ismail Ahmed

Assistant Professor of chemical pathology

Medical Research Institute

Alexandria University

Dr. Amel Abdel Fattah Kamel

Assistant Professor of chemical pathology

Medical Research Institute

Alexandria University

Dr. Nadia Ali Sadek

Assistant Professor of Hematology

Medical Research Institute

Alexandria University

Acknowledgement

I Worship GOD thankfully, without His help nothing could be reached .

I am unable to find words adequate to express my gratefulness, deep and intense feeling of gratitude to Prof. Dr. Mona Mohamed Abaza, Professor of chemical pathology, University of Alexandria , for her constructive guidance, precious advice, valuable support, continuous encouragement, unlimited help and efforts in reading and revising this thesis.

I am unable to find words adequate to express my gratefulness to Dr. Yousri Ismail Ahmed, Assistant Professor of chemical pathology, University of Alexandria, for his help and experience he offered to me in this study, may God rest him in peace.

It is my great pleasure to express my profound gratitude to Dr. Amel Abdel Fattah Kamel, Assistant Professor of chemical pathology, University of Alexandria, for her indispensable help, patience and deep participation, co-operation and experience she offered to me in this study.

Many thanks and appreciation to Prof. Dr. Nadia Ali Sadek, Professor of Hematology for supplying me with materials needed for this study and her noteworthy advices.

Also I wish to thank all patients, without their co-operation this thesis could not be done.

Contents

Chapter	Page
Introduction	1
Aim of the work	44
Material and methods	45
Results	65
Discussion	85
Summary and Conclusion	97
References	99
Protocol	
Arabic summary	

List of abbreviations

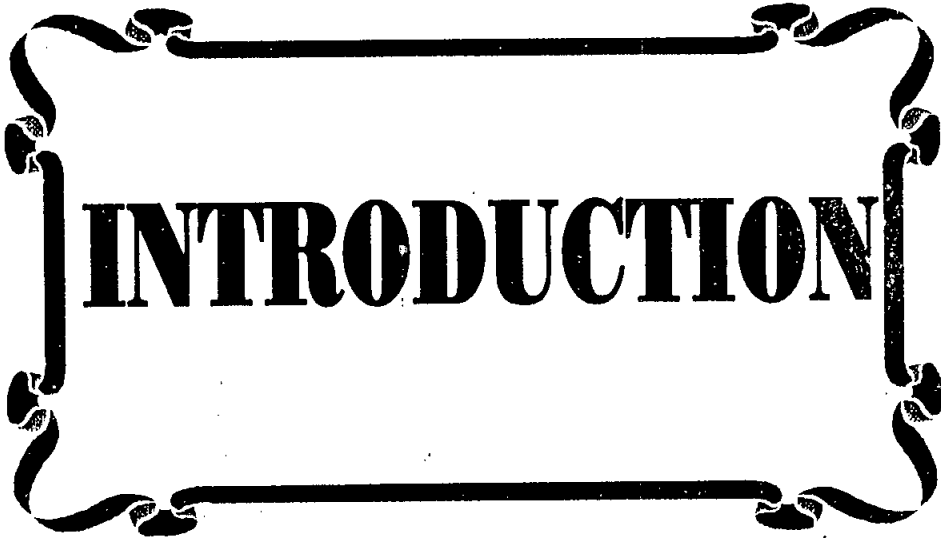
DMT	Divalent Metal Transporter
GSH	Reduced glutathione
HDL-C	High Density Lipoprotein Cholesterol
IRE	Iron Regulatory Element
IRP	Iron Regulatory protein
LDL-C	Low Density Lipoprotein Cholesterol
PUFAs	Polyunsaturated fatty acids
SOD	Superoxide dismutase
TIBC	Total Iron Binding Capacity
VLDL-C	Very Low Density Lipoprotein Cholesterol

List of tables

no	Title	Page
I	The percentage of the original disease in the iron deficiency anemia group .	66
II	Mean values of complete blood picture in the studied groups.	68
III	Total serum iron, Total Iron Binding Capacity (TIBC), transferrin% saturation and serum ferritin levels of the control group.	71
IV	Total serum iron, Total Iron Binding Capacity (TIBC), transferrin% saturation and serum ferritin levels of the iron deficiency anemia group.	72
V	Serum total cholesterol (T. Ch), high density lipoprotein cholesterol (HDL-Ch) and low density lipoprotein cholesterol (LDL-Ch) levels in the control group.	75
VI	Serum total cholesterol (T. Ch), high density lipoprotein cholesterol (HDL-Ch) and low density lipoprotein cholesterol (LDL-Ch) levels in the iron deficiency anemia group.	76
VII	Plasma α -tocopherol levels (mg/dl) of the studied groups.	78
VIII	Blood glutathione levels (mg/dl) of the studied groups.	81
IX	Mean values of the studied parameters levels in the controls and patients groups divided according to the cause of iron deficiency anemia.	84

List of figures

NO	Title	Page
1	Pathways of iron metabolism.	6
2	The interacting mechanisms of cell injury by oxidative stress.	20
3	Lipid peroxidation reaction.	28
4	Structural formulae of vitamin E compounds.	36
5	Structure of glutathione.	41
6	Glutathione redox cycle-oxidation and reduction of glutathione.	43
7	Ferritin standard curve.	52
8	α -Tocopherol standard curve.	57
9	Glutathione standard curve.	61
10	Total serum iron levels ($\mu\text{g/dl}$), TIBC values ($\mu\text{g/dl}$) of the studied groups.	73
11	Serum ferritin levels of the studied groups.	73
12	Plasma α -tocopherol (mg/dl) of the studied groups.	79
13	Blood glutathione levels (mg/dl) of the studied groups.	82



INTRODUCTION

INTRODUCTION

Iron deficiency anemia

Iron deficiency is one of the most prevalent disorders in humans.^(1,2) It remains common despite improvements in diet and more effective and wide spread use of well absorbed forms of iron to fortify foods.⁽³⁾ The prevalence of iron deficiency varies widely with geography, socioeconomic status and age.⁽⁴⁾ It is particularly a disease of children, young women and all older persons, but it occurs in persons at all ages and social strata.⁽¹⁾

Definition

The term iron deficiency refers to iron lack of sufficient severity to restrict the production of hemoglobin. Iron deficiency anemia represents the most severe form of iron deficiency that occurs when the concentration of hemoglobin has fallen sufficiently because of iron lack to fulfill the laboratory definition of anemia, namely when it is below the 95 percent reference range for age.⁽³⁾

Etiology

Although an individual's need for dietary iron is small and will only manifest itself after iron storage sites in the body have been depleted, iron deficiency anemia is one of the most frequently encountered types of anemia.^(2,5)

Iron deficiency may result from at least four conditions:^(5,6)

- 1- Nutritional deficiency, where not enough iron is consumed to meet the normal , or daily requirement of iron, for example fad diets and an imbalanced vegetarian diet.
- 2- Faulty or incomplete iron absorption, for example achlorhydria in certain disorders or following gastric resection, chronic diarrhea associated with disorders such as celiac disease, sprue or resection of the small bowel, and the absence of factors needed for iron absorption such as gastric acid and bile .
- 3- An increased demand for iron that is not met, such as during pregnancy, the growth years or periods of increased blood regeneration.
- 4- Excessive loss of iron, for example due to acute or chronic hemorrhage or heavy menstruation.

Iron deficiency may result from several other less commonly occurring conditions: a disorder of iron utilization, selected hemoglobinopathies , anemia related to chronic disorders , chronic inflammation , parasitic infections such as hookworm , and a deficiency of the plasma iron transporting protein transferrin .⁽⁵⁾

Clinical presentation

Symptoms that may be elicited only by a thorough medical review of systems may relate directly to the cause of iron deficiency or to the general manifestations of anemia. Often however, minimal symptoms may be