

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم



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





بعض الوثائق الأصلية تالفة





بالرسالة صفحات لم ترد بالأصل



***DISTURBANCE OF SOME ELECTROLYTES AND
TRACE ELEMENTS BEFORE AND AFTER
HEMODIALYSIS IN RENAL FAILURE
AND TRANSPLANTED PATIENTS***

Thesis submitted by

SAYEDA HAMAD ABD EL HAMID

For the fulfilment of Master Degree of Science in (Biochemistry)

Under supervision of

Prof. Dr. MOHAMED O. I. REFAIE

Prof. Of Biochemistry

Lab. of Biochemistry

Faculty of science

Cairo University

Dr. MOHAMED ALY EL-DESOUKY

Lecturer Of Biochemistry

Lab. of Biochemistry

Faculty of science

Cairo University

Dr. AHMED IBRAHIM AMIN

Lecturer Of Biochemistry

Lab. of Biochemistry

Faculty of science

Cairo University

Faculty of Science

Cairo University

2005

B

11772

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْنَا

أَنْتَ أَعْلَمُ الْغُيُوبِ

سورة البقرة آية (٣٢)

APPROVAL SHEET FOR SUBMISSION

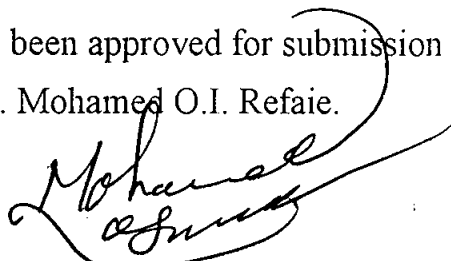
Title of (master) thesis: DISTURBANCE OF SOME ELECTROLYTES AND TRACE ELEMENTS BEFORE AND AFTER HEMODIALYSIS IN RENAL FAILURE AND TRANSPLANTED PATIENTS.

Name of the candidate: Sayeda Hamad Abd El Hamid

This thesis has been approved for submission by the supervisors:

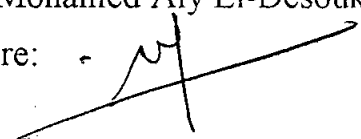
1- Prof. Dr. Mohamed O.I. Refaie.

Signature:



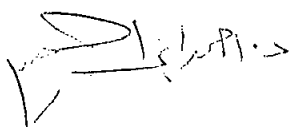
2- Dr. Mohamed Aly El-Desouky

Signature:

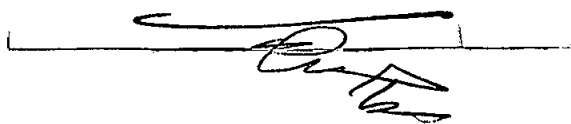


3- Dr. Ahmed Ibrahim Amin

Signature:



Prof. Dr. Rifaat H. Hilal



**Chairman Of Chemistry Department
Faculty Of Science Cairo University.**

APPROVAL SHEET FOR SUBMISSION

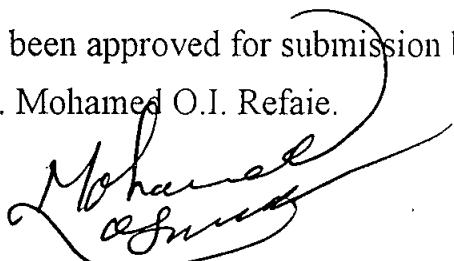
Title of (master) thesis: DISTURBANCE OF SOME ELECTROLYTES AND TRACE ELEMENTS BEFORE AND AFTER HEMODIALYSIS IN RENAL FAILURE AND TRANSPLANTED PATIENTS.

Name of the candidate: Sayeda Hamad Abd El Hamid

This thesis has been approved for submission by the supervisors:

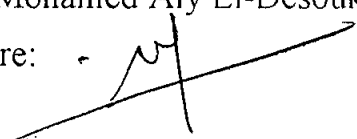
1- Prof. Dr. Mohamed O.I. Refaie.

Signature:



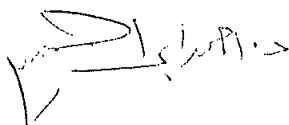
2- Dr. Mohamed Aly El-Desouky

Signature:

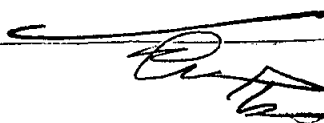


3- Dr. Ahmed Ibrahim Amin

Signature:



Prof. Dr. Rifaat H. Hilal



**Chairman Of Chemistry Department
Faculty Of Science Cairo University.**

ABSTRACT

Name: Sayeda Hamad Abd El Hamid

Title of Thesis:

DISTURBANCE OF SOME ELECTROLYTES AND TRACE ELEMENTS
BEFORE AND AFTER HEMODIALYSIS IN RENAL FAILURE AND
TRANSPLANTED PATIENTS.

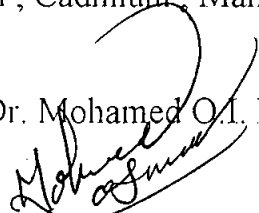
Degree (Master) Thesis, Faculty Of Science, Cairo University, 2002/2003.

Renal failure is associated with a disturbance of some electrolytes and trace elements metabolism. The presence of renal failure contributed to the regulation of blood levels of phosphate and the excretion rate of potassium and sodium. Our study which consisted of a healthy control subjects (GI). Patients undergoing hemodialysis (HD) (GII), the same patients were classified under (GIIA) before HD & (GIIB) after HD, renal transplanted patients (GIII); aims to determine some electrolytes and trace elements in sera of these groups. Experimental data have shown significant increase in sera magnesium (Mg); copper (Cu) and manganese (Mn) of patients after HD, as compared to the same patients before HD. A significant decrease in sera magnesium (Mg), was recorded in transplanted patients; while the level of manganese (Mn) was significantly elevated as compared with control group. Moreover, the level of serum cadmium (Cd) was significantly increased in patients before and after HD as compared with control group. On the other hand, the level of serum cadmium (Cd) in patients after HD was significantly decreased as compared to the same patients before HD. In addition, the level of sodium (Na); potassium (K); calcium (Ca) and phosphorus (P) in human sera were closely related to the renal failure. In conclusion, early monitoring of serum hemodialysis are important for abnormalities in patients undergoing hemodialysis are important for prevention any complications.

Key words: Magnesium , Cadmium , Manganese, Copper, Chronic Renal Failure.

Supervisors:

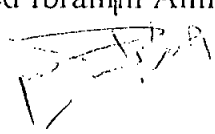
(1) Prof. Dr. Mohamed O.I. Refaie.

Signature: 

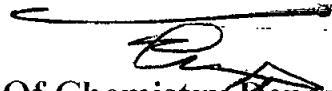
(2) Dr. Mohamed Aly El-Desouky

Signature: 

(3) Dr. Ahmed Ibrahim Amin

Signature: 

Prof. Dr. Rifaat H. Helal


Chairman Of Chemistry Department
Faculty Of Science Cairo University.

ABSTRACT

Name: Sayeda Hamad Abd El Hamid

Title of Thesis:

**DISTURBANCE OF SOME ELECTROLYTES AND TRACE ELEMENTS
BEFORE AND AFTER HEMODIALYSIS IN RENAL FAILURE AND
TRANSPLANTED PATIENTS.**

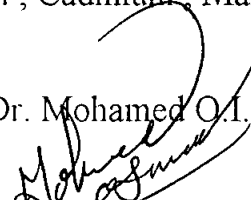
Degree (Master) Thesis, Faculty Of Science, Cairo University, 2002/2003.

Renal failure is associated with a disturbance of some electrolytes and trace elements metabolism. The presence of renal failure contributed to the regulation of blood levels of phosphate and the excretion rate of potassium and sodium. Our study which consisted of a healthy control subjects (GI). Patients undergoing hemodialysis (HD) (GII), the same patients were classified under (GIIA) before HD & (GIIB) after HD, renal transplanted patients (GIII); aims to determine some electrolytes and trace elements in sera of these groups. Experimental data have shown significant increase in sera magnesium (Mg); copper (Cu) and manganese (Mn) of patients after HD, as compared to the same patients before HD. A significant decrease in sera magnesium (Mg), was recorded in transplanted patients; while the level of manganese (Mn) was significantly elevated as compared with control group. Moreover, the level of serum cadmium (Cd) was significantly increased in patients before and after HD as compared with control group. On the other hand, the level of serum cadmium (Cd) in patients after HD was significantly decreased as compared to the same patients before HD. In addition, the level of sodium (Na); potassium (K); calcium (Ca) and phosphorus (P) in human sera were closely related to the renal failure. In conclusion, early monitoring of serum hemodialysis are important for abnormalities in patients undergoing hemodialysis are important for prevention any complications.

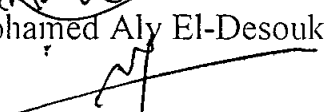
Key words: Magnesium , Cadmium , Manganese, Copper, Chronic Renal Failure.

Supervisors:

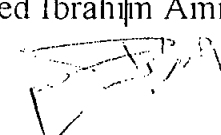
(1) Prof. Dr. Mohamed O.I. Refaie.

Signature: 

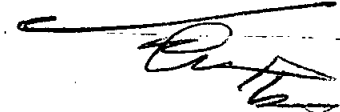
(2) Dr. Mohamed Aly El-Desouky

Signature: 

(3) Dr. Ahmed Ibrahim Amin

Signature: 

Prof. Dr. Rifaat H. Helal


**Chairman Of Chemistry Department
Faculty Of Science Cairo University.**

AKNOWLEDGEMENT

I would like to express my deep thanks and gratitude to professor Dr. Mohamed Osman Ibrahim Refaie, professor of biochemistry, lab of Biochemical Analysis, faculty of science, university of Cairo for his supervision, appreciated advice, and the facilities, he offered to carry out this work and sincere cooperation without, he this work would not have been possible.

I am also grateful and offer deep thanks to Dr. Mohamed Aly El-Desouky, lecturer of biochemistry, faculty of science, university of Cairo. And Dr. Ahmed Ibrahim Amin lecturer of biochemistry, faculty of science, university of Cairo. For their supervisions, valuable suggestions, encouragement and all possible help, they kindly offered throughout the course of this work.

Great thanks also to Dr. Mohamed masoad, the general manger of Omm El-Massryeen laboratory, for his cooperation encouragement and all possible help.

I would like to express my deep thanks and gratitude to Dr. Mohamed Abd El-Aziz, the general maneger of Omm El-Massryeen Hospital, El Tammin El sehy , for his encouragement

And the facilities and all possible help.

Especial appreciation is expressed to my parents, brothers and sisters for their patience, and understanding which encouraged me throughout this study.

CONTENTS

CHAPTERS	PAGE
I- <u>INTRODUCTION AND AIM OF THE WORK</u>	
I-1 Biochemical function of normal kidney and acid-base disorders	1
I-2 Chronic and acute renal failure	9
I-3 Hemodialysis and renal transplantation	12
I-4 Trace elements	19
Part II Glutathione peroxidase in anamalian erythrocytes	23
I-5 Aim of the work	24
II- <u>REVIEW OF LITERATURE DATA</u>	
II-1 Copper metabolism and its clinical significance	25
II-2 Elevated plasma copper in chronic renal failure	31
II-3 Manganese metabolism and its clinical significance	31
II-4 Magnesium metabolism and its clinical significance	34
II-5 Relationship between calcium, magnesium, and phosphates concentrations, in hemodialyzed patients being treated by regular hemodialysis	37
II-6 Relationship between circulating ionized and total magnesium in chronic renal failure patients	40
II-7 Magnesium content in tissues and bones of uremic patients on chronic hemodialysis	41
II-8 Cadmium metabolism, and its clinical significance	45
III- <u>SUBJECTS MATERIALS AND METHODS</u>	85

CHAPTERS	PAGE
III-1 Subjects, Materials and Methods	52
III-2 Atomic Absorption Spectrophotometer	54
III-3 Determination of serum magnesium	55
III-4 Determination of serum copper	58
III-5 Determination of serum manganese	60
III-6 Determination of serum cadmium	62
III-7 Determination of serum sodium	63
III-8 Determination of serum potassium	65
III-9 Determination of serum calcium	67
III-10 Determination of blood sugar	69
III-11 Determination of blood urea	72
III-12 Quantitative estimation of serum creatinine	74
III-13 Determination of serum uric acid	76
III-14 Determination of serum transaminases	78
III-15 Determination of hemoglobin	82
Part II Determination of glutathione peroxidase in erythrocyte lysate	84
IV- <u>EXPERIMENTAL RESULTS</u>	86
IV-1 Magnesium	86
IV-2 Copper	90
IV-3 Manganese	94
IV-4 Cadmium	98
IV-5 Glutathione peroxidase	
V- <u>DISCUSSION</u>	110
VI- <u>ENGLISH&ARABIC SUMMARY</u>	130
VII- <u>REFERENCES</u>	133

LIST OF ABBREVIATIONS

CRF	chronic renal failure
GFR	glomerular filtration rate
BUN	blood urea nitrogen
P(cells)	principal cells
I(cells)	intercalated cells
ESRD	end stage renal failure
ARF	acute renal failure
ATN	acute tubular necrosis
CCPD	continuous cyclic peritoneal dialysis
CAPD	continuous ambulatory peritoneal dialysis
IPD	intermittent peritoneal dialysis
ECC	extracorporeal circuit
HLA	human leukocyte antigens
SOD	superoxide dismutase
PCA	principal component analysis
NPC	nasopharyngeal cancer
ESADDI	estimated safe and adequate dietary intake
TPN	Total parenteral nutrition
Mg-prot.	protein – bound magnesium
iMg⁺²	ionized magnesium
Mg compl.	magnesium complexed with anions
Mg ultr.	ultrafiltrable magnesium
ROD	renal osteodystrophy
BMg	bone magnesium
DMg	dialysate magnesium
SMg	serum magnesium
FRTR	feline renal transplant recipients
WHO	world health organization
NAG	N - acetyl – glucosaminidase
GSH-Px	Glutathione peroxidase