STUDY OF THE PROBLEM OF HYPERALUMINAEMIA IN CHILDREN WITH **CHRONIC RENAL FAILURE**

Thesis

Submitted for partial fulfillment of Master Degree in Paediatrics



63374

By

Sherif Mohamed El Desouky Ibrahim

M.B., B.Ch., Ain Shams University

Supervised by

rof. Dr. Farida Ahmed Farid

Professor of Paediatrics Jaculty of Medicine, Ain Shams University

Prof. Dr. Akcela Kaisser Khella

Professor & Head of Community Medicine Dept. Faculty of Medicine, Ain Shams University

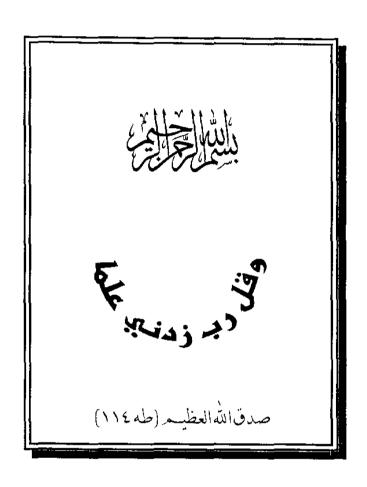
Dr. Zeinab Awad El-Sayed

Assist. Prof. of Paediatrics Jaculty of Medicine, Ain Shams University

> Faculty of Medicine Ain Shams University 1997







Acknowledgment

First and foremost, I thank *God* Almighty, the Beneficent and the Most Merciful.

I wish to express my sincere gratitude and appreciation to *Prof. Dr. Farida Ahmed Farid*, Professor of Pediatrics, Ain Shams University, for her generous help, emminent supervision and careful review of all the details of this work.

I am extremely grateful to *Dr. Zeinab Awad El- Sayed*, Ass. Prof. of Pediatrics, Ain Shams University, for her continuous guidance, kind supervision and assistance offered throughout the entire work.

I want to express my deepest appreciation to **Prof. Dr. Akila K. Khella**, Professor and Head of Community Medicine Department, Ain Shams University.

I would like to thank *Prof. Dr. Ahmed Abd El Karim*, Professor of Public Health Ain Shams University, for his remarkable help and excellent experience in the practical part of this work.

Last, but certainly not least, I am grateful to everyone who participated in the evaluation of this work.

Sherif El Desouky

CONTENTS

	Page
Introduction	I
Aim of the work	3
Review of Literature	4
 Sources of aluminum 	11
 Measurement of serum aluminum 	16
 Toxicity of aluminum 	18
 The nervous system and aluminum 	19
 aluminum bone disease 	24
• Anemia	28
 Aluminum and other disorders 	31
 Diagnosis of aluminum overload 	33
Management of aluminum toxicity	36
Subjects and Methods	
Results	50
Discussion	74
Summary and Conclusions	
Recommendations	
References	
Arabic Summary	



LIST OF TABLES

Tab. No.	Title	Page
1	Factors affecting aluminum absorption	7
2	Estimate of aluminum intake and	8
	absorption from various sources	
3	Percent of elemental aluminum	14
	contained in aluminum-containing	
	drugs	
4	List of aluminum levels of commonly	14
	used intravenous solutions	
5	Progression of neurologic changes in	21
	children developing the	
	encephalopathy of progressive renal	
	failure	
6	Interpretation and normal values of	34
	serum aluminum	
7	Hazards of deferioxamine	42
	administration	
8	Clinical data of chronic renal failure	51
	patients	
9	laboratory data of chronic renal failure	52
	patients	
10	Clinical and laboratory data of the	53
	control group	
11	Serum aluminum levels in the groups	54
	of the study	

12	comparison between CRF patients and		
	control group as regards laboratory		
	parameters		
13	Aluminum levels in different water samples	57	
14	Correlation betweenserum aluminum before DFO test and other parameters of CRF patients	70	

LIST OF FIGURES

Fig. No.	Title	Page
1	Monitoring and diagnosis of aluminum	37
	accumulation and toxicity	
2	comparison between mean level of	58
	scrum aluminum in patients with Hb <7	
	gm% versus those with Hb >7 gm%	
	(before and after DFO test)	
3	Comparison between mean level of	59
	serum aluminum in CRF patients with	
	frequency of blood transfusion \geq	
	1month versus < 1 month (before and	
	after DFO test)	
4	comparison between mean levels of	60
	serum aluminum in CRF patients with	
	and without EPO treatment (before and	
	after DFO test)	
5	Mean levels of Hb% in CRF patients	61
	with and without EPO treatment	
6	Correlation between MCV and serum	62
	aluminum (before DFO test) in CRF	
	patients	
7	Correlation between Hb% and serum	63
	aluminum (before DFO test) in CRF	
	patients	

8	Comparison between mean levels of	64
	serum aluminum in CRF patients with	
	and without orthopedic manifestations	
	(before and after DFO test)	
9	comparison between mean levels of	65
	serum aluminum in CRF patients with	
	normal PTH <55 pgm/ml versus PTH	
	level >55 pgm/ml before and after	
	DFO test	
10	Correlation between PTH and serum	66
	aluminum (before DFO test) in CRF	
	patients	
11	Correlation between serum alkaline	67
	phosphatase and serum aluminum	
	(before DFO test) in CRF patients	
12	Comparison between mean levels of	68
	serum aluminum in CRF patients with	
	and without neuropsychiatric	
	manifestations (before and after DFO	
	test)	
13	Correlation between duration of	71
	disease (months) and serum aluminum	
	(before DFO test) in the patients group	
14	Correlation between glumerular	72
	filtration rate and serum aluminum	
	(before DFO test) in the patients group	
15	Correlation between serum ferritin and	73
	serum aluminum (before DFO test) in	
	the patients group	

Introduction and Aim of the work

