



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني 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



MONA MAGHRABY

Impact of Hemodialysis Time Prolongation on Blood Pressure Control

A Thesis

Submitted for partial fulfillment of Master degree
in Nephrology

By

Heba Soliman Mohammed Soliman
M.B.B.Ch

Under Supervision of

Prof. Dr. Magdy Mohammed Saed El-Sharkawy

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

Dr. Nahla Mohamed Teama

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

Dr. Reem Mohsen El-Sharabasy

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

Faculty of Medicine
Ain Shams University

2020

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سَبِّحْكَ لَا إِلَهَ إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدق الله العظيم

سورة البقرة الآية: ٢٢



Acknowledgments

*First and foremost, I feel always indebted to **Allah**, the **Most Beneficent** and **Merciful** who gave me the strength to accomplish this work,*

*My deepest gratitude **Prof. Dr. Magdy Mohammed Saed El-Sharkawy**, Professor of Internal Medicine and Nephrology, Faculty of Medicine, Ain Shams University, for his valuable guidance and expert supervision, in addition to his great deal of support and encouragement. I really have the honor to complete this work under his supervision.*

*I would like to express my great and deep appreciation and thanks to **Dr. Nahla Mohamed Teama**, Lecturer of Internal Medicine and Nephrology, Faculty of Medicine, Ain Shams University, for her meticulous supervision, and her patience in reviewing and correcting this work,*

*I must express my deepest thanks to **Dr. Reem Mohsen El-Sharabasy**, Lecturer of Internal Medicine and Nephrology, Faculty of Medicine, Ain Shams University, for guiding me throughout this work and for granting me much of her time. I greatly appreciate her efforts.*

*Special thanks to my **Parents**, my **Husband** and all my **Family** members for their continuous encouragement, enduring me and standing by me.*

 **Heba Soliman Mohammed Soliman**

List of Contents

<i>Subject</i>	<i>Page No.</i>
List of Abbreviations.....	i
List of Tables.....	iv
List of Figures	vi
Introduction	1
Aim of the Work.....	3
Review of Literature	
Epidemiology & pathogenesis of Hypertension in Hemodialysis population.....	4
Management of hypertension in hemodialysis population.....	26
Dialysis intensification.....	50
Patients and Methods.....	73
Results.....	77
Discussion	111
Summary	123
Conclusion and Recommendations.....	127
References	129
Arabic Summary	—

List of Abbreviations

Abbr.	Full-term
ACEI	: Angiotensin converting enzyme inhibitor
ADMA	: Asymmetric dimethylarginine
Ag II	: Angiotensin
AMBP	: Ambulatory blood pressure Monitoring
ANP	: Atrial natriuretic peptide
ARB	: Angiotensin receptor blockers
ASH	: American Society of Hypertension
ASN	: American Society of Nephrology
AVF	: Artrio-venous fistula
AVG	: Artrio-venous Graft
BB	: Beta blocker
BNP	: Brain natriuretic peptide
BP	: Blood pressure
Ca-P	: Calcium Phosphate Product
CBC	: Complete Blood Count
CCB	: Calcium channel blocker
CRIC	: Chronic Renal Insufficiency Cohort
CRP	: C-reactive protein
CVD	: Cardiovascular disease
DASH	: The Dietary Approach to Stop Hypertension
DBP	: Diastolic blood pressure
DHB-CCB	: Dihydropyridines calcium channel blocker
DM	: Diabetes
DOPPS	: Dialysis Outcomes and Practice Pattern

DW	: Dry weight
ECF	: Extra cellular Fluid
ECV	: Extra cellular volume
ED	: Endothelial dysfunction
EG-NICE	: Egyptian Nephrology Initiative of Care and Excellency
EPO	: Erythropoietin
ERA-EDTA	: European Renal Association- European Dialysis and Transplant Association
ERA-EDTA	: The European Renal Association-European Dialysis and Transplantation Association
ESA	: Erythropoietin stimulating agents
ESH	: European Society of Hypertension
ESRD	: End stage renal disease
EURE-CA-m	: European Renal and Cardiovascular medicine
FHN	: Frequent Hemodialysis Network
HGB	: Hemoglobin
HCV	: Hepatitis C Virus
HD	: Heamodialysis
HDF	: Hemodiafiltration
HF	: Heart failure
HTN	: Hypertension
IDH	: Intradialytic hypotension
IDWG	: Interdialytic weight gain
K	: Potassium
KDIGO	: Kidney Disease Improving Global Outcomes
LV	: Left ventricle
LVH	: Left ventricular hypertrophy

MBD	: Mineral bone disease
MRA	: Mineralocorticoid receptor antagonists
MRI	: Magnetic resonance imaging
MSNA	: Skeletal muscle Sympathetic Nerve activity
Na	: Sodium
NKF-KDOQI	: National Kidney Foundation- Kidney Diseases Outcome Quality Initiative
NO	: Nitric Oxide
OSA	: Obstructive Sleep Apnea
PCR	: Polymerase Chain Reaction
PLT	: Platelets
PRA	: Plasma renin activity
PTH	: Parathormone
PWV	: Pulse wave velocity
RAAS	: Renin- Angiotensin -Aldosterone System
SBP	: Systolic blood pressure
SD	: Standard deviation
SNS	: Sympathetic nervous system
SPSS	: Statistical package for social science
TT	: Treatment time
UF	: Ultrafiltration
UFR	: Ultrafiltration rate
URR	: Urea Reduction ratio
USRSD	: United States Renal System Data
VEGF	: Vascular endothelial growth factor
WBC	: White blood cell

List of Tables

Table No.	Title	Page No.
Table (1):	Comparison between groups as regard demographic data.	78
Table (2):	Comparison between groups as regard etiology of ESRD.....	80
Table (3):	Comparison between groups as regard urea reduction ratio (URR %) over the study period.....	81
Table (4):	Comparison between study group and control group as regard serum phosphate level.	83
Table (5):	Comparison between groups as regard average lab results over the study period	85
Table (6):	Comparison between groups as regard UF volume.	88
Table (7):	The effect of HD session on SBP (mmHg) in study group (A).....	89
Table (8):	The effect of HD session on SBP (mmHg) in control group (B).	91
Table (9):	Comparison between groups as regard predialysis SBP (mmHg)	93
Table (10):	Comparison between groups as regard postdialysis SBP (mmHg).....	95
Table (11):	Comparison between groups as regard the effect of HD session on SBP (mmHg).....	97

Table (12):	The effect of HD session on DBP (mmHg) in group A.	98
Table (13):	The effect of HD session on DBP in group B.	100
Table (14):	Comparison between groups as regard predialysis DBP (mmHg).	102
Table (15):	Comparison between groups as regard postdialysis DBP (mmHg).	104
Table (16):	Comparison between groups as regard mean difference before and after session in diastolic blood pressure (mmHg).	106
Table (17):	Drug intake during follow up period in both groups	107
Table (18):	Comparison between study group and control group according to complications observed during sessions.	110

List of Figures

Figure No.	Title	Page No.
Figure (1):	Pathophysiology of hypertension	9
Figure (2):	Oxidative stress has been implicated in the pathophysiology of many cardiovascular disorders including hypertension	18
Figure (3):	Relationship between hypertension and obstructive sleep apnea	19
Figure (4):	Causes of increased oxidative stress in hemodialysis patients.....	21
Figure (5):	Oxidative stress induced endothelial dysfunction	22
Figure (6):	Weekly average intradialytic systolic blood pressure (SBP) during haemodialysis with low and high dialysate sodium (Na) by randomization sequence (group 1)	36
Figure (7):	Comparison between groups as regard vascular access (frequency).	79
Figure (8):	Comparison between the causes of renal disease in both groups.....	80
Figure (9):	Comparison between groups as regard urea reduction ratio.	82
Figure (10):	Comparison between study group and control group as regard serum phosphate level.....	84

Figure (11):	Comparison between groups as regard Ca-P product (mg/ dl) over the study period.	86
Figure (12):	Comparison between groups as regard hemoglobin over the study period.	86
Figure (13):	Comparison between groups as regard white blood cells over the study period	87
Figure (14):	Comparison between groups as regard to platelets concentration over the study period.....	87
Figure (15):	Comparison between groups as regard UF volume.....	88
Figure (16):	Comparison between pre and postdialysis as regard SBP (mmHg) in group A.....	90
Figure (17):	Comparison between pre- and postdialysis systolic blood pressure (mmHg) in control (B) group.....	92
Figure (18):	Comparison between groups as regard predialysis SBP (mmHg).....	94
Figure (19):	Comparison between groups as regards postdialysis SBP (mmHg).....	96
Figure (20):	Comparison between pre and postdialysis DBP after 1 st & 6 th month of follow up in group A.	99
Figure (21):	Comparison between pre- & postdialysis diastolic blood pressure (mmHg) in control (B) group.	101

Figure (22):	Comparison between study group and control group according to predialysis DBP (mmHg)	103
Figure (23):	Comparison between study group and control group according to posdialysis diastolic blood pressure (mmHg).....	105
Figure (24):	Bar chart between study group and control group according to medication.....	108
Figure (25):	Bar chart between study group and control group according to Ca carbonate/ acetate and renagel.	108
Figure (26):	Bar chart between study group and control group according to recombinant erythropoietin administration/ weeks.	109
Figure (27):	Bar chart between study group and control group according to complications.	110