

Current Status of the Implication of the Clinical
Practice Pattern in Hemodialysis Prescription in
Regular Hemodialysis Patients in Egypt (Cairo)
Naser city (sector B4)

Thesis

Submitted for partial fulfillment of Master Degree
in Internal Medicine

By

Hosam Elsayed Hoseiny

M.B.B.CH. – Ain Shams University

Under Supervision of

Prof. Dr. Khaled Hussien Abo Seif

Professor of Internal Medicine and Nephrology

Faculty of Medicine – Ain Shams University

Prof. Dr. Ahmed Aziz Abd-Elnaby

Professor of Internal Medicine and Nephrology


Faculty of Medicine – Ain Shams University

Dr. Essam Nour El-Din Afifi

assistant Professor of Internal Medicine and Nephrology

Faculty of Medicine-Ain Shams University

Faculty of Medicine
Ain Shams University
2014



بسم الله الرحمن الرحيم
وَقُلْ رَبِّ زِدْنِي عِلْمًا □

صدق الله العظيم □
طه الآية ●●● □



*First and foremost thanks to **ALLAH**, the Most Merciful.*

*I wish to express my deep appreciation and sincere gratitude to **Prof Dr. Khaled Hussien Abo Sief** , Professor of Internal Medicine and nephrology, Ain Shams University, for his close supervision, valuable instructions, continuous help, patience, advices and guidance. He has generously devoted much of his time and effort for planning and supervision of this study. It was a great honor to me to work under his direct supervision.*

*I wish to express my great thanks and gratitude to **Prof Dr. Ahmed Aziz AbdElnabi** Professor of Internal Medicine and nephrology, Ain Shams University, for his kind supervision, indispensable advice and great help in this work.*

*I wish to express my great thanks and gratitude to **Dr. EssamNour El Din Afifi** assistant Professor of Internal Medicine and nephrology, Ain Shams University, for his kind supervision, indispensable advice and great help in this work.*

Last and not least, I want to thank all my family, my wife, my colleagues, , for their valuable help and support.

Finally I would present all my appreciations to my patients without them, this work could not have been completed.

Hossam Alsayed Hosieny

LIST OF TABLES

Table No.	Title	Page
Table (1):	Elements of Hemodialysis Prescription.....	5
Table (2):	Gender and age distribution in the study population.....	55
Table (3):	Different causes of ESRD in the study population	56
Table (4):	Work status in the study population	57
Table (5):	Dependency status in the study population.....	58
Table (6):	Frequency of HD sessions/week in the study population	59
Table (7):	Duration of HD session in the study population	60
Table (8):	Sponsoring status in the study population	61
Table (9):	Type of vascular access in the study population	62
Table (10):	percent of access failure in the study population	63
Table (11):	Frequencey of access failure in the study population.....	64
Table (12):	The levels of Hemoglobin during the last 6 months.....	65
Table (13):	Hemoglobin category in the study population	65
Table (14):	History of blood transfusion in the study population	66
Table (15):	Different types of ESA used by the study population	67
Table (16):	Frequency of ESA brand used by the study population.....	68
Table (17):	Dose of ESA used by the study population	69
Table (18):	History of iron injection in the study population	71
Table (19):	History of vitamin B complex use in the study population	72
Table (20):	History of vitaminD use in the study population	73
Table (21):	Dose of vitaminD used by the study population	74
Table (22):	The levels of Calcium, phosphorus and PTH during the last 6 months covered by the study.....	75

LIST OF CONTENTS

Title	Page No.
Introduction	1
Aim of The Work	3
REVIEW OF LITERATURE	
Chapter 1: Hemodialysis prescription	4
Chapter 2: Hemodialysis associated comorbidities.....	28
Chapter 3: Guidelines for kidney diseases	34
Chapter 4: Hemodialysis in <i>Egypt</i>	45
Patients and Methods.....	49
Results	55
Discussion.....	87
Summary and conclusion.....	95
Recommendations	99
References	101
Arabic Summary	120

LIST OF TABLES (Cont....)

Table No.	Title	Page
Table (23):	Calcium levels in the study population.....	76
Table (24):	Phosphorus level in the study population.	77
Table (25):	Calcium phosphorus product level in the study population. ..	78
Table (26):	Occurrence of hypotension during HD session in the study population.	79
Table (27):	Occurrence of cramps during HD session in the study population.	80
Table (28):	Occurrence of itching during HD session in the study population.	81
Table (29):	HCV status in the study population	82
Table (30):	HBV status in the study population	83
Table (31):	Criteria of dialyzer used in the study population	84

LIST OF FIGURES

Figure No.	Title	Page
Figure (1):	Mechanisms of solutes removal in hemodialysis (William,1999)	8
Figure (2):	Comparison of urea clearance rates between low- and high-efficiency hemodialyzers	13
Figure (3):	Water permeability of a membrane and control of volumetric ultrafiltration in hemodialysis.....	17
Figure (4):	Pathways of thrombogenesis in extracorporeal circuits. (William, 1999)	21
Figure (5):	The development of clinical practice guidelines.....	36
Figure (6):	Gender distribution in the study population.....	55
Figure (7):	Different causes of ESRD in the study population	56
Figure (8):	Work status in the study population	57
Figure (9):	Dependancy status in the study population.....	58
Figure (10):	Frequency of HD sessions/week in the study population...	59
Figure (11):	Duration of HD session in the study population	60
Figure (12):	Sponsoring status in the study population	61
Figure (13):	Sponsoring status in the study population	62
Figure (14):	Percent of access failure in the study population	63
Figure (15):	Frequencey of access failure in the study population.....	64
Figure (16):	Hemoglobin category in the study population	66
Figure (17):	History of blood transfusion in the study Population	67
Figure (18):	Different types of ESA used by the study population	68
Figure (19):	History of iron injection in the study population	70
Figure (20):	History of iron injection in the study population.....	71
Figure (21):	History of vitaminB complex use in the study population .	72
Figure (22):	History of vitamin D use in the study population	73

LIST OF FIGURES (Cont....)

Figure No.	Title	Page
Figure (23):	History of vitamin D dose in the study population	74
Figure (24):	Calcium levels in the study population.....	76
Figure (25):	Phosphorus level in the study population	77
Figure (26):	Calcium phosphorus product level in the study population	78
Figure (27):	Occurrence of hypotension during HD session in the study population.	79
Figure (28):	Occurrence of cramps during HD session in the study population.	80
Figure (29):	Occurrence of itching during HD session in the study population.	81
Figure (30):	HCV status in the study poulation.....	82
Figure (31):	HBV status in the study population.....	83
Figure (32):	Criteria of dialyzer used in the study population	84

LIST OF ABBREVIATIONS

Abbrev.	Full term
AV	Arteriovenous access
BFR	Blood flow rate
BMI	Body mass index
BP	Blood pressure
BUN	Blood Urea Nitrogen
CAPD	Continuous ambulatory peritoneal dialysis
CAPR	Cardiopulmonary recirculation
CKD	Chronic kidney disease
CMS	US Centers for Medicare and Medicaid Services
CPG	Clinical practice guidelines
CRP	C- reactive protein
CVC	Central venous catheter
CVD	Cardiovascular disease
DFR	Dialysate flow rate
DM	Diabetes mellitus
DOPPS	Dialysis outcome and practice pattern study
ERA-EDTA	the European Renal Association-European Dialysis and Transplantation association
ESRD	End stage renal disease
GFR	Glomerular filtration rate
GraDe	Grades of recommendation assessment, Development, and evaluation
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus

LIST OF ABBREVIATIONS (Cont....)

Abbrev.	Full term
HD	Hemodialysis
HDF	Hemodiafiltration
HF	Hemofiltration
HTN	Hypertension
IPD	Intermittent peritoneal dialysis
K/DOQI	Kidney Disease Outcome Quality Initiative
KDIGO	Kidney disease improving global outcomes
KOA	The mass transfer area coefficient
MIA	Malnutrition -Inflammation atherosclerosis (MIA) Syndrome
MICS	‘malnutrition–inflammation complex syndrome’
MOH	Ministry of health
NKF	National Kidney Foundation
PEM	Protein energy malnutrition
QIP	Quality improvement programs
RRT	Renal replacement therapy
SRI	Solute removal index
TMP	Transmembrane pressure
TNF α	Tumor necrosis factor
UF	Ultrafiltration
UKM	Urea kinetic modeling
Up_{post}HD	Urea posthemodialysis
Up_{pre}HD	Urea prehemodialysis
URR	Urea reduction ratio
β2M	Beta 2 microglobulin
(K_{uf})	The ultrafiltration coefficient

INTRODUCTION

Studies examining the link between research evidence and clinical practice have consistently shown gaps between the evidence and current practice. Some studies in the United States suggest that 30%-40% of patients do not receive evidence-based care, while in 20% of patients care may be not needed or potentially harmful. However, relatively little information exists about how to apply evidence in clinical practice, and data on the effect of evidence-based guidelines on knowledge uptake, process of care or patient outcomes is limited .(*Locatelli et al., 2004*)

Appropriately then, the care of dialysis patients has been the prime focus of nephrology, particularly after the widespread availability of maintenance dialysis when it became evident that mortality of dialyzed patients was high and their quality of life far from adequate.(*Ekonyan et al,2002*)

Guidelines practiced on anemia and actual practices are much different with different places and patients according to treatment. Moreover, in individual countries and individual units within countries local circumstances relating to economic conditions; organization of health care delivery or even legal

constraints may render the immediate implementation of best practice guidelines difficult or impossible. Nevertheless, they provide a goal against which progress can be measured. (*Locatelli et al., 2004*)

Compliance with clinical guidelines is an important indicator of quality and efficacy of patient care , at the same time their adaptation in clinical practice may be initiated by numerous factors including; clinical experts, patient performance, constrains of public health policies, community standard, budgetary limitation and methods of feeding back information concerning current practice. (*Cameron, 1999*)

End-stage renal disease (ESRD) is one of the main health problems in Egypt. Currently, hemodialysis represents the main mode for treatment of chronic kidney disease stage 5 (CKD5), previously called ESRD or chronic renal failure .(*Afifi ,1999*)

Although hemodialysis is often used for treatment of ESRD, no practice guidelines are available in Egypt. Healthcare facilities are seeking nowadays to develop practice guidelines for the sake of improving healthcare services. (*Ministry of Health and Population,1999*)

AIM OF THE WORK

To study the pattern of current clinical practice in hemodialysis prescription in regular hemodialysis patients in Egypt and to compare this pattern with standard international guidelines in hemodialysis prescription , stressing on anemia, bone disease management and adequacy of dialysis.

HEMODIALYSIS PRESCRIPTION

Uremia is a quite complex syndrome encompassing metabolic disorders and accumulation of various sized uremic toxins (*Vanholder et al., 2003*); that it would be impossible for intermittent renal replacement therapy (RRT) to replace the homeostatic role of the kidneys. Hence, the importance of providing at least adequate dialysis. (*Ekonyan, 2005*)

Eradication of uremic symptoms was supposed to predict good long term results of dialysis-low morbidity and mortality. This approach of assessing adequacy is subjective, requires very careful monitoring of patients, and is time consuming (*Twardowski, 2003*)

Hemodialysis (HD) therapy has been one of the true success stories in the annals of medical science. Before the availability of this treatment, the diagnosis of kidney failure was a death sentence. (*Butman and Nissenson, 2005*)

Unfortunately, despite major advances in the technology of HD and in the management of its complications, the morbidity and mortality of patients on dialysis remain high, at a time that the incidence and prevalence of kidney failure persistently are increasing. Hence, the early and continued concern with the adequacy of dialysis . (*Ekonyan, 2005*)

Optimal care of the patient receiving long-term HD requires broad knowledge of the HD technique and appropriate prescription according to patient- and device-dependent variables (*Ikizler and Schulman, 2005*).

Table (1): Elements of Hemodialysis Prescription

Dialyzer
Time & frequency
Blood flow rate
Dialysate flow rate
Ultrafiltration rate
Dialysate composition
Anticoagulation

(*Brenner and Rectors, 2008*).

1-Dialyzers

Types of dialyzers and its choice

The dialyzers are calssified either according to their synthetic material into: cellulose, modified cellulose or synthetic polymers Or according to their hydrokinetics into High-Flux &Low-Flux Dialyzers. All dialyzers in clinical use are of the hollow-fiber type with membranes of cellulose, modified cellulose or synthetic polymers. (*Ronco and Clark, 2005*)