Nutritional Status in relation to Adequacy of Dialysis in Hemodialysis Patients; a multicenter Study in Egypt

Thesis

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By

AmiraHussienMoussaAbd El-Moteleb

(M.B,B.ch)

Under Supervision Of

Prof. Hany Ali Refaat Ali

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

Dr.Waleed Ahmed Bichari Ali

Assistant professorof Internal Medicine and Nephrology
Faculty of Medicine- Ain Shams University

Dr. Sherry RedaKamel Attallah

Assistant professorof Internal Medicine and Nephrology
Faculty of Medicine- Ain Shams University

Ain Shams University

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حالة التغذية وعلاقتها بكفاءة الاستصفاء الدموي لمرضى الغسيل الكلوي دراسة في مراكز متعددة في مصر

رسالة

توطئة للحصول على درجة الماجستير في **الكلى**

مقدمة من

أميـرة حسيـن موسـى عبد المطلـب

بكالوريوس الطب والجراحة – كلية طب قناة السويس

تحت إشراف

أ.د/هانـي علـي رفعـت علـي

استاذ الباطنة العامة والكلى

كلية الطب – جامعة عين شمس

د/وليـد أحمـد بشـاري علـي

أستاذ مساعد الباطنة العامة والكلى

كلية الطب – جامعة عين شمس

د/شيـري رضـا كامـل عطـا الله

أستاذ مساعد الباطنة العامة والكلى

كلية الطب – جامعة عين شمس

كلية الطب

جامعة عين شمس

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Dedication

To My

Mother & Father

For their warm affection, patience, encouragement, and for always being there when I needed them

To

My husband **Eng. Eisa Nassar** *who always support me, my Children* **Somia & Mahmoud** *who fill my life with joy*

Contents

List of Abbreviations

ADPKD	**:**	Autosomal dominant polycystic kidney disease
25 (OH) D3	**:**	25 Hydroxycholecalciferol
BIA	**:**	Bio impedance analysis
BMI	**:**	Body Mass Index
BSA	**:**	Body surface area
BUN	**:**	Blood Urea Nitrogen
CKD	**:**	Chronic Kidney Disease
CRI	**:**	Chronic renal impairment
CRP	**:**	C-reactive protein
CVD	**:**	Cardiovascular Disease
DEXA	**:**	Dual-Energy X-ray Absorptiometry
DM	**:**	Diabetes Mellitus
DOPPS	**:**	Dialysis Outcomes and Practice Patterns Study
EBPG	**:**	European Best Practice Guidelines
eKt/V_{urea}	**:**	Equilibrated eKt/V_{urea}
ER	**:**	Extraction ratio
ESKD	**:**	End Stage Kidney Disease
ESR	**:**	Erythrocyte Sedimentation Rate
ESRD	**:**	End Stage Renal Disease
G	**:**	Urea generation rate
GFR	**:**	Glomerular filtration rate

GN	**:**	Glomerulonephritis
Hb%		Hemoglobin
HD	**:**	Hemodialysis
HTN	**:**	Hypertension
ID	**:**	Interdialytic
IDPN	**:**	Intradialytic parenteral nutrition
IL-6	**:**	interleukin-6
K/DOQI	**:**	Kidney Disease/Dialysis Outcomes and Quality Initiative
K0A	**:**	Dialyzer mass transfer area coefficient
Kd	**:**	Dialyser clearance
Kr	**:**	Kidney clearance
Kt/V	**:**	kinetic modeling of urea
LBM	**:**	Lean Body Mass
LDL	**:**	Low Dinesty Lipoprotein
MIA syndrome	**:**	Malnutrition, Inflammation, and Atherosclerosis syndrome
MS	**:**	Malnutrition score
NCDS	**:**	National Cooperative Dialysis Study
NHANES II	**:**	National Health and Nutrition Examination Surveys
NKF	**:**	National Kidney Foundation
nPCR	**:**	Normalized protein catabolic rate

PNA	**:**	protein equivalent of nitrogen appearance
Qb_w	**:**	blood water flow
Qf	**:**	Urea clearance from ultrafiltration
SGA	**:**	Subjective Global Assessment
spKt/V	:	Single pool kinetic modeling of urea
Td	**:**	Time on dialysis
TPN	**:**	Total Prenteral Nutrition
Tr	**:**	Time interval between two dialysis procedures
URR	**:**	Urea reduction ratio
V	**:**	Volume of solute distribution
V_{urea}	**:**	Urea volume

List of Tables

List of Figures

Introduction

Regardless of the obvious technological progress in the development of dialysis procedures, the adequacy of hemodialysis (HD) and nourishment are important determinants of the quality of life and have a direct impact on morbidity and mortality of patients who are being treated with chronic HD ***(Nunes et al., 2008).***

It is estimated that improvement of nutrition might postpone the progression and lessen expected complications in patients who suffer from severe renal insufficiency ***(Chazot et al., 2001).***

The concept of quality, adequacy or appropriateness of HD, which were introduced in the 1970s, implies dialysis which enables patients to have a normal quality of life, as well as solid clinical tolerance with minimal problems during the dialysis and inter-dialysis periods. The most widely accepted model for objective quantification of HD efficiency is the kinetic model of urea (Kt/V). This defines all necessary parameters of dialysis, keeping in mind the high levels of protein catabolism and elimination of urea ***(Kooman et al., 2007).***

Since the time when Quinan (1826) and Christison (1829) substantiated that an increased concentration of urea characterizes patients who suffer from kidney insufficiency, and up to the time when HD was introduced as a method of treatment, there have been attempts to quantify the implemented therapeutic procedure. Dialysis is an adequate medical treatment if it enables patients to achieve full rehabilitation. That includes satisfactory nutritional intake, normalization of hypertension and correction of anemia, as well as lack of symptoms of uremic neuropathy. In the early seventies of the last century, Gotch and Sargent and later on Daurgirdas and Schneditz quantified the dialysis dose through a formula, based on a mathematical model and taking into account objective laboratory parameter ***(Fouque et al., 2007).***

The K-DOQI recommends that the Kt/V value should not be lower than 1.25. Causes of malnutrition might be sought in the very nature of the kidney disease, in some adjunct co-morbid disease lack of appetite, inappropriate diet, low dose of dialysis, deficits of glucose and amino acids during HD, acidosis and the occurrence of chronic infections ***(Stolici et al., 2008).***

By improving the effects of dialysis, removing uremic toxins and increasing the HD adequacy index, we may stimulate appetite and thus contribute to enhancing the intake of nutritious elements. Nutritive status is estimated on the basis of biochemical parameters, but the reference values are arguable, because all available evidence indicates that there is no consensus about the normal state

Yang et al., confirmed that an increase of protein level improves the Kt/V index as these two parameters were significantly correlated and are important for the quality of life of HD patient ***(Young Do et al., 2007).*** Increase providing sufficient nutritional input micronutrients, protein and energy matter is the right measure of a good diet regime in patients on HD ***(Termoshuizen et al., 2004).***

Aim of the work

The aim of this study is to assess nutritional status in relation to adequacy of dialysis in hemodialysis patient in multiple centers of hemodialysis in Egypt.