Cardiac Structure and Function in Predialysis Chronic Kidney Disease Patients

Thesis

Submitted for Partial Fulfillment of Master Degree in Internal Medicine

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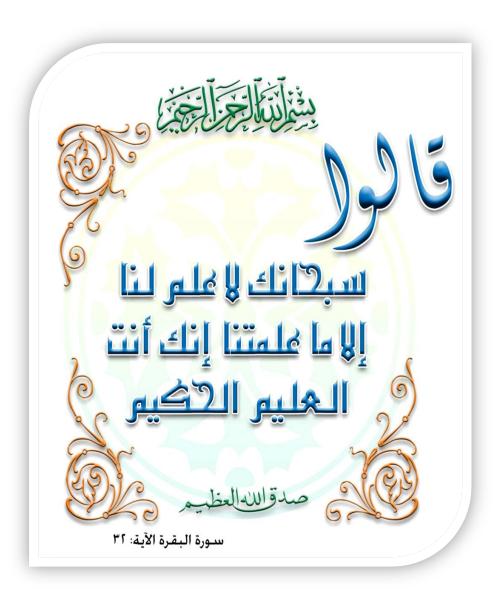
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Ahmed Mosleh Monir

Dedication

I dedicate this work with sincere love and appreciation to my **Father**, for his great support and assistance.

Ahmed Mosleh

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List of Abbreviations

Abbr. Full-term

ACE Angio-tensin enzyme
Alb/Cr Albumin/creatinine
ALK Alkalinephosphatase
ApoB Apolipoprotein B
ApoC Apolipoprotein C
ARBs Angiotensin receptor blocker
ARIC Atherosclerosis Risk in Communities

AVF Arterio-venous fistula

BMI Body mass index
BP Blood pressure

Ca Calcium

CARE Combined analysis of the cholesterol and recurrent

events

CERA Continous erythropiosis receptor activator

CKD Chronic kidney disease CRP C reactive protein

CRS Cardio renal syndrome

CV Cardiovascular

CVD Cardiovascular disease DBP Diastolic blood pressure

DC Dentrite cells

DKD Diabetic kidney disease

DM Diabetis mellitus
 DN Diabetic nephropathy
 ECHO Echocardiograghy
 EDV End diastolic volume
 EF Ejection fraction

eGFR Estimated glomerular filteration rate

EPO Erythropiotin

ESRD End stage renal disease FBG Fasting blood glucose

FDA Food and Drug Administration
FGF 23 Fibroblast growth factor 23
GMB Glomerular basement membrane

HB HemoglobinHBV Hepatitis B virusHCV Hepatitis C virusHD Hemodialysis

HDL High density lipoprotein

HF Heart failure

HF-REF Heart failure reduced left ventricle ejection fraction

HIF Hypoxia inducible factor HPS Heart protection study

HTN Hypertension

IDL Intermediate density lipoprotein

KDIGO Kidney disease improving global outcomes

LDL Low density lipoprotein

Lp(a) Lipoprotein a LV Left ventricle

LVH Left ventricular hypertrophy

LVM Left ventricle mass

MC Mast cell

MDRD Modification of diet in renal disease study

mPAP Mean pulmonary arterial pressure

NO Nitric oxide

PAH Pulmonary arterial hypertension
PCWP Pulmonary capillary wedge pressure

PH Pulmonary hypertension

PLT Platelets Po4 Phosphorus

PTH Parathyroid hormone
RAS Renin angiotensin system
RCT Randomized control trial
SBP Systolic blood pressure
SD Standard deviation

T1DM Type 1 diabetes mellitus

TC Total cholesterol

List of Abbreviations

TG Triglyceride

TNT Treatment to new targets
UAE Urinary albumin excretion

US Ultrasound

VDR Vitamin D receptor

VLDL Very low density lipoprotein VSMC Vascular smooth muscle cell

WBC White blood cell

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Introduction

Phronic kidney disease (CKD) is a global public health problem and is associated with increased cardiovascular risk and mortality and increased incidence of heart failure (HF) (*Park et al*, 2012, *Cai et al.*, 2014).

Cardiovascular mortality is estimated to be at least 10- to 100- fold higher in patients with end stage renal disease (ESRD) than in the age-, race-, and sex-matched general population (*Go et al.*, 2004).

This higher mortality is attributed to an increased risk of developing accelerated atherosclerosis, inflammation, vascular calcification, heart failure, and sudden cardiac death (*Herzog et al.*, 2011).

Cardiac structural and functional changes are important subclinical measures that have been associated with adverse clinical outcomes among patients with CKD and ESRD and a key factor in accelerating heart failure risk in these patients (Otsuka et al., 2009, Park et al., 2012, Bansal et al., 2013, Cai et al., 2014).

A better understanding of changes in left ventricular structure and function during the transition from CKD to ESRD may provide important insights to opportunities to improve cardiovascular outcomes.

Aim of the Work

The aim of the present study is to evaluate changes in cardiac structure and function among pre-dialysis CKD patients without heart failure and to assess the possible relationship between these changes and clinical and laboratory data.

Chapter 1 Chronic Kidney Disease

Thronic kidney disease (CKD) is defined as abnormalities of kidney structure or function, present for > 3 months, with implications for health. CKD is classified based on cause, GFR category (G1–G5), and albuminuria category (A1–A3), abbreviated as CGA (Wheeler et al., 2017).

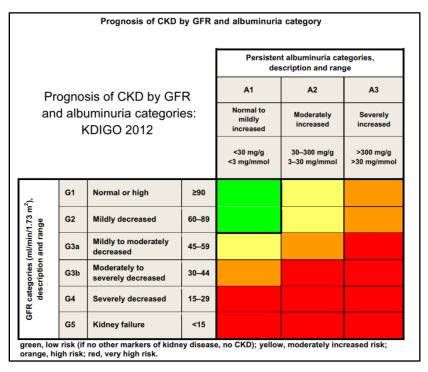


Figure (1): Stages of chronic kidney disease (KDIGO, 2012)

The *eGFR* is primarily determined by serum creatinine (SCr), and the preferred method for estimating GFR is the body surface area-normalized, 4-variable, Modification of