Evaluation of Serum Omentin-1 Levels in Chronic Kidney Disease Patients with and without Type 2 Diabetes Mellitus

Thesis

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List of Abbreviations

Abb.	Full term
ACE	angiotensin converting enzyme
ACR	Albumin creatinine ratio
AGE	Advanced glycation end-products
AIDS	Acquired immune-deficiency syndrome
C-ANCA	Cytoplasmic pattern antineutrophil cytoplasmic antibody
CKD	Chronic kidney disease
COX	Cyclooxygenase
CTGF	Connective tissue growth factor
DKD	Diabetic kidney disease
DM	Diabetes mellitus
DN	Diabetic nephropathy
DNA	Deoxyribonucleic acid
DNP	Diabetic neuropathy
ECM	Extracellular matrix
ECs	Endothelial cells
ELISA	Enzyme-linked immunosorbent assay
ESRD	End-stage renal disease
FDA	Food and drug administration
FDR	First degree relative
FPG	Fasting plasma glucose
FSGS	Focal and segmental glomerulosclerosis
GDM	Gestational diabetes mellitus
GFR	Glomerular filtration rate

Abb.	Full term
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HDL-C	High-density lipoprotein cholesterol
HIV	Human immunodeficiency virus
HOMA	Homeostasis model assessment
HUS	Hemolytic-uremic syndrome
IFG	Impaired fasting glucose
IgA	Immunoglobulin A
IGT	Impaired glucose tolerance
IR	Insulin resistance
JNK	Jun N- terminal kinase
LDL	Low-density lipoprotein
LDLC	Low-density lipoprotein cholesterol
MAPK	Mitogen-activated protein kinase
MDRD	Modification of Diet in Renal Disease
Mo	Monocytes
MODY	Maturity-onset diabetes of the young
MPGN	Minimal change disease, Membranoproliferative glomerulonephritis
NAFLD	Non alcoholic fatty liver disease
NF-κB	Nuclear factor-κB
NO	Nitric oxide
OGTT	Oral glucose tolerance test
PCOD	Polycystic Ovary Disease
PDGF	Platelet-derived growth factor
PKC-β	Protein kinase-c beta

Abb.	Full term
RAS	Renin-angiotensin system
SPSS	Statistical Package for Special Science
T2DM	Type 2 diabetes mellitus
TINU	Tubulointerstitial nephritis and uveitis
TNF alpha	Tumor necrosis factor
Treg	Regulatory T-cells
TTP	Thrombotic thrombocytopenic purpura
VEGF	Vascular endothelial growth factor
VSMC	Vascular smooth muscle cell
WC	Waist conference

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Abstract:

Background:

Omentin-1 a new anti-inflammatory adipokine has been identified as a major visceral (omental) secretory adipokine which plays important roles in glucose homeostasis, lipid metabolism, insulin resistance and diabetes.

Objectives: This study aimed to investigate the level of Omentin-1 in chronic kidney disease patients with and without type 2 diabetes mellitus.

Methods: The study included 70 patients who further subdivided into three subgroups (20 T2DM, 25T2DM+CKD, 25CKD) and 20 healthy subjects formed the control group. They subjected to full clinical examination, weight, height, waist and hip circumference and BMI was calculated.Lipid profile, omentin-1, kidney function test, UACR, and HbA1c were measured.

Results : Serum omentin-1 level was lower in all patient groups compared to healthy control. It's level was lower in groups with T2DM than CKD only group. It had a negative correlation with HbA1c, cholesterol total, TGs, LDL-c and e-GFR ,and a positive correlation with s.creatinine, UACR, BUN, HDL-c. The best cut off point of serum omentin-1 was **<=330 ng/ml** to differentiate group 3(T2DM+CKD) from control group using ROC curve analysis.

Conclusion: The results of the present study suggest that diabetes mellitus may be associated with lower omentin levels in CKD population . 2

Key words: Serum Omentin-1, Chronic Kidney Disease, Type 2 Diabetes Mellitus

Introduction

Chronic kidney disease (CKD) is an increasing worldwide public health problem which causes high mortality and morbidity **(Foley et al., 1998).**

Diabetes is the most common cause of CKD and kidney failure. In the U.S, diabetic nephropathy accounts for about 40% of new cases of ESRD **(Ekinci et al., 2013).**

A cross-sectional study was conducted at 15 dialysis centers in governmental hospitals in El-Sharkia, revealed that Hypertension and diabetes were the main causes of ESRD. 15.5% of ESRD patients had diabetes mellitus, 31.8% had hypertension **(Ghonemy et al., 2016).**

Generally in Egypt, the estimated prevalence of ESRD increased from 225 per million population in 1996 to 375 per million in 2001. They found that the prevalence of diabetic nephropathy as a cause of ESRD increased from 8.9% of patients in 1996 to 14.5% in 2001. Mortality among diabetic patients with ESRD in Egypt is higher than mortality for all other causes of ESRD which is probably related to the well known cardiovascular complications of diabetes **(Afifi, 2003).**

Adipose tissue actively influence neuroendocrine, cardiovascular and immune systems by secreting proteins

and other products (called adipokines), as well as responding to neural, hormonal, and nutritional signals **(Flier, 2004).**

In recent years, one of these useful adipokines called Omentin-1, secreted by vascular stromal cells in the visceral adipose tissue (also named intelectin-1, endothelial lectin, or galactofuranose-binding lectin) has frequently been studied. Circulating Omentin levels, negatively correlate with body mass index, fat mass, insulin resistance and fasting plasma insulin, and positively correlated with adiponectin, high-density lipoprotein cholesterol (HDL-C), and endothelial functions **(Pan et al., 2010).**

These findings indicate that Omentin-1 may play a role as a beneficial protective adipokine. It inhibits tumor necrosis factor alpha induced inflammation **(Kazama et al., 2012).**

Furthermore, some reports have demonstrated an inverse association between Omentin-1 and inflammation **(Pan et al., 2010)** and atherosclerosis in different patient cohorts. However, changes in serum Omentin-1 levels in diabetic and non-diabetic CKD patients have not yet been revealed. **(Shibata et al., 2011)**

Aim of the Work

To investigate the level of Omentin-1 in CKD patients with and without type 2 diabetes mellitus.

Type 2 Diabetes Mellitus

Introduction:

Diabetes mellitus (DM) has routinely been described as a metabolic disorder characterized by hyperglycemia that develops as a consequence of defects in insulin secretion, insulin action, or both. Type 2 diabetes encompasses individuals who have insulin resistance (IR) and usually relative (rather than absolute) insulin deficiency. Chronicity of hyperglycemia is associated with long-term damage and failure of various organ systems mainly affecting the eyes, nerves, kidneys, and the heart **(Chawla et al., 2016).**

Epidemiology:

Globally, approximately half (50%) of the people aged 20-79 years with diabetes are unaware of their disease, though this proportion varies by world region and opportunities for systematic or opportunistic screening, ranging between a third undiagnosed overall in high-income countries, to more than 75% undiagnosed in low-income countries **(IDF Atlas data, 2017).**