

Assessment of Correlation between Angiopoietin-Like Protein II (ANGPTL-2) and Insulin Resistance in Type 2 DM Cases and Obese Persons

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لَسْبَدَانِكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

صدق الله العظيم

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List of Contents

Subject	Page No.
List of Abbreviations	I
List of Tables	V
List of Figures.....	VII
Introduction.....	1
Aim of the Work.....	4
Review of Literature	
Chapter (1): Diabetes Mellitus	5
Chapter (2): Insulin Resistance	40
Chapter (3): Obesity	60
Chapter (4): Angiotensin-Like Protein	97
Patients and Methods	123
Results	141
Discussion.....	179
Summary	190
Conclusion	195
Recommendations	196
References	197
Arabic Summary	—

List of Abbreviations

Abb.	Full term
2hpp	2 hours post prandial
ACE	Angiotensin- converting enzyme.
ADA	American diabetes association
AGE	Advanced glycation end products
ANGPTL-2	Angiopietin-like protein II level
apo B	Apolipoprotein B
ARB	Angiotensin recptor blocker
ATP	Adenosine triphosphate
ATP III	Adult Treatment Pannel III
BMAL1	Brain and muscle aryl hydrocarbon receptor nuclear translocator like protein 1
BMI	Body mass index
CAD	Coronary artery disease
C-AMP	Cyclic adenosine monophosphate
CHD	Coronary heart disease
CKD	Chronic kidney disease
CLOCK	Circadian locomotor output kaput
CVD	Cardiovascular disease.
CYP	Cytochrome p
DAN	Diabetic autonomic neuropathy
DBP	Diastolic blood pressure
DCCT	Diabetes Control and Complications Trial
DDP-4	Dipeptidyl peptidase -4
DM	Diabetes mellitus
DR	Diabetic retinopathy
DSPN	Distal symmetrical sensorimotor polyneuropathy

Abb.	Full term
ELISA	Enzyme linked immunosorbant assay.
eNOS	Endothelial enzyme nitric oxide synthase
ER	Rough endoplasmic reticulum
FFA	Free fatty acid
FPG	Fasting plasma glucose.
GLUT 4	Glucose transporter 4
GTP	Guanosine tri- phosphate
GWAS	Genome wide association study
HDL-c	High density lipoprotein cholesterol
HOMA-IR	Homeostasis model assessment for insulin resistance
HRP	Horseradish Peroxidase
Hs-CRP	High sensitive C reactive protein
ICAM-1	Intracellular adhesion molecule-1
IDDM	Insulin dependent Diabetes mellitus.
IDF	International Diabetes Federation
IFN	Interferon
IGF-1	Insulin-like growth factor I
IGF-II	Insulin-like growth factor II
IGT	Impaired glucose tolerance
IGTT	Insulin glucose tolerance test
IKK-Eβ	Inhibitor of Kappa beta kinase
IL-6	Interleukin-6
IR	Insulin resistance
IRS-1, 2	Insulin receptor substrate1,2
LDL-c	Low-density lipoprotein cholesterol.
LILRB2	Leukocyte immunoglobulin-like receptor subfamily B member 2 i
m RNA	Messenger Ribonucleic acid

Abb.	Full term
MAbs	Monoclonal antibodies
MAPK	Mitogen activated protein kinase
MCP-1	Monocytes chemo-attractant protein-1
MODY 1	Maturity onset diabetes of the young 1
NADPH	Nicotinamide adenine dinucleotide phosphate
NCEP	National Cholesterol Education Program
NF-kB	Nuclear factor-kappaB
NGSP	National Glycohemoglobin Standardization Program
NHANES	National Health and Nutrition Examination Survey
NO	Nitric oxide
OD	Optical density
OGTT	Oral glucose tolerance test
OSA	Obstructive sleep apnea
PAD	Peripheral arterial disease
PAI-1	Plasminogen activator inhibitor-1
PCOS	Polycystic ovary syndrome
PDGF	Platelet driven growth factor
PI3-K	Phosphatidylinositol 3-kinase
PIP-3K	Phosphatidylinositol triphosphate Kinase
PPAR	Peroxisome proliferator activated receptors
RAAS	Renin Angiotensinogen-Aldosterone system
Roc-Curve	Receiver operating characteristics curve analysis.
SBP	Systolic blood pressure
T2DM	Type 2 Diabetes mellitus.
TG	Triglycerides

Abb.	Full term
TGF	Transforming growth factor.
TGF-B	Transforming growth factor B
TH0	T-helper 1
Th1	T-helper 1
TIA	Transient ischemic attacks
TLR	Toll-like receptors
TMB	Tetramethylbenzidine
TNF-α	Tumor necrosis factor alpha
TZD	Thiazolidinedione
UKPDS	United Kingdom Prospective Diabetes Study
USA	United States of America.
VEGF	Vascular endothelial growth factor
VLDL	Very low density lipoprotein
WHR	Waist hip ratio

List of Tables

Table	Title	Page
	<i>Table of Review and Subject and Methods</i>	
1	Diagnostic criteria for DM	9
2	Diagnostic criteria for prediabetes	11
3	Stages of diabetic nephropathy	30
4	Management of CKD in diabetes	30
5	Criteria for diagnosis of metabolic syndrome	59
6	Classification of obesity in adults	63
	<i>Table of Results</i>	
7	Comparison between the four studied groups regarding different parameters	156
8	Comparison between the four studied groups regarding gender, smoking history and fundus examination	157
9	Comparison between the four studied groups as regard ANGPTL-2	158
10	Comparison between the four studied groups as regards carotid hs-CRP	160
11	Comparison between the studied groups as regards HOMA-IR	161
12	Comparison between obese and non obese subjects as regards serum ANGPTL-2:	162
13	Comparison between diabetic and non-diabetic subjects as regards serum ANGPTL-2	163

Table	Title	Page
14	Mean ANGPTL-2 level in diabetic patients with and without Diabetic retinopathy	164
15	Patients with IR in each group	165
16	Comparison between subjects with and without insulin resistance among the 4 studied groups: numerical variables	165
17	Comparison between subjects with and without insulin resistance regarding ANGPTL-2	166
18	ROC curve analysis for the diagnostic value of ANGPTL-2 in discrimination between subjects with or without insulin resistance	167
19	Multivariable binary logistic regression analysis for the relation between ANGPTL-2 and insulin resistance as adjusted for obesity and T2DM	168
20	Multivariable binary logistic regression analysis for the relation between ANGPTL-2 and T2DM as adjusted for insulin resistance and obesity	168
21	Multivariable binary logistic regression analysis for the relation between ANGPTL-2 and obesity as adjusted for insulin resistance and T2DM	169
22	Correlation between ANGPTL-2 and other numerical variables in all the 4 studied groups	169

List of Figures

Figure	Title	Page
1	Mechanisms by which hyperglycemia induced diabetic vascular complications	19
2	Schematic presentation of insulin signalling pathways	45
3	The main molecular mechanisms involved in the development of insulin resistance associated with obesity	51
4	Classification of fat and distribution of white adipose tissue (WAT) and brown adipose tissue (BAT)	66
5	White adipose tissue is a highly active organ secreting various peptides implicated in inflammatory and metabolic processes	66
6	Anatomical localization of the main abdominal adipose tissue depots	68
7	Excess energy intake enhances adipose tissue inflammation and contributes to the development of metabolic syndrome	74
8	Adipocyte-macrophage interaction leading to dysfunction	79
9	Schematic protein structure of an ANGPTL	98
10	The role of ANGPTL-2 in physiological and pathological adipose tissue remodeling	104

Figure	Title	Page
11	A proposed model of adipocyte-derived ANGPTL2 contribution to inflammation, insulin resistance, and vascular dysfunctions	110
12	Comparison between the four studied groups regarding ANGPTL-2	159
13	Comparison between the four studied groups regarding hs-CRP	160
14	Comparison between the four studied groups regarding HOMA-IR	161
15	Comparison between obese and non obese subjects as regards serum ANGPTL-2	162
16	Comparison between diabetic and non-diabetic subjects as regards serum ANGPTL-2	163
17	Mean ANGPTL-2 level in patients with Diabetic retinopathy	164
18	Comparison between Subjects with and without insulin resistance regarding ANGPTL-2	166
19	ROC curve for discrimination between subjects with or without insulin resistance using serum ANGPTL-2	167
20	Scatter plot showing the correlation between ANGPTL-2 and age	170

Figure	Title	Page
21	Scatter plot showing the correlation between ANGPTL-2 and BMI	170
22	Scatter plot showing the correlation between ANGPTL-2 and waist circumference	171
23	Scatter plot showing the correlation between ANGPTL-2 and systolic BP	171
24	Scatter plot showing the correlation between ANGPTL-2 and diastolic BP	172
25	Scatter plot showing the correlation between ANGPTL-2 and FBS	172
26	Scatter plot showing the correlation between ANGPTL-2 and fasting serum insulin	172
27	Scatter plot showing the correlation between ANGPTL-2 and HbA1c	172
28	Scatter plot showing the correlation between ANGLP2 and HOMA-IR	173
29	Scatter plot showing the correlation between ANGPTL-2 and the duration of DM	173
30	Scatter plot showing the correlation between ANGPTL-2 and protein/creatinine ratio	175
31	Scatter plot showing the correlation between ANGLP2 and total cholesterol	175

Figure	Title	Page
32	Scatter plot showing the correlation between ANGPTL-2 and TAG	176
33	Scatter plot showing the correlation between ANGPTL-2 and LDL-C	176
34	Scatter plot showing the correlation between ANGPTL-2 and HDL-c	177
35	Scatter plot showing the correlation between ANGPTL-2 and hs-CRP	177
36	Scatter plot showing the correlation between ANGPTL-2 and HbA1c	178

Assessment of Correlation between Angiopoietin-Like Protein II (ANGPTL-2) and Insulin Resistance in Type 2 DM Cases and Obese Persons

Abstract

Introduction: ANGPTL-2 is primarily secreted by adipose tissue. Increased circulating ANGPTL2 levels are closely related to adiposity, inflammation and systemic insulin resistance. is to assess the correlation between angiopoietin-like protein II (ANGPTL-2) and insulin resistance in type 2 DM cases and obese persons.

Materials and methods: a total 80 subjects were included in the study their mean age was 51 ± 6 years old, and they were divided into four groups. Group (I) Included 20 obese type 2 diabetic patients, group (II) Included 20 obese non-diabetic patients, group (III) Included 20 lean type 2 diabetic patients and group (IV) Included 20 lean non-diabetic subjects as control. All subjects in this study were subjected to full medical history taking, thorough physical examination, fundus examination, abdominal ultrasound, FPG, HbA1c, lipid profile, ALT, AST, Creatinine, BUN, HCV antibody, HBs Ag, Urinary protein creatinine ratio, HOMA IR, Serum ANGPTL-2 and hs-CRP.

Results: The present study showed that there was a high statistical significant difference between the studied groups ($p\text{-value} < 0.01$), being the highest in group I (mean 12.6 ± 4.1 ng/ml) followed by group III (9.5 ± 3.8 ng/ml), group II (7.6 ± 3.2 ng/ml) and group IV (5.6 ± 1.8 ng/ml).

Moreover, Serum ANGPTL-2 level was significantly higher in type 2 diabetic patients with diabetic retinopathy. Multivariable binary logistic regression analysis in the current study demonstrated that ANGPTL-2 was found to be an independent predictor for insulin resistance and T2DM but not for obesity.

Conclusion: ANGPTL-2 can be used as an independent predictor for insulin resistance and T2DM.

Keywords: Angiopoietin-like protein II level, Fasting plasma glucose, Type 2 Diabetes mellitus.