The Relation between serum Omentin and insulin resistance in Gestational diabetes

THESIS

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LIST OF ABBREVIATIONS

ACOG	American College of Obstetricians and Gynecologists
ADA	American Dental Association
ADAMTS	A Disintegrin and Metalloproteinase with Thrombospondin motifs
Akt	Protein kinase B (PKB)
AMPK	5' adenosine monophosphate-activated protein kinase is an enzyme
BMI	Body Mass Index
CAD	Coronary artery disease
cDNA	Complementary DNA
CIMT	Carotid intima-media thickness
Col II	Collagen type II
COX-2	Cyclooxygenase-2
CRP	C-reactive protein
DPP4	Dipeptidyl peptidase-4 inhibitors
EC	Endothelial cell
ELISA	Enzyme-linked immunoassay
eNOS	Endothelial nitric oxide synthase
FDA	Food and Drug Administration
FFAs	Free fatty acids
GAD	Glutamic acid decarboxylase
GDM	Gestational diabetes mellitus
GLP-1	Glucagon-like peptide-1
GLUT4	Glucose transporter type 4
HAPO	Hyperglycemia and Adverse Pregnancy Outcomes
HDL	High-density lipoprotein
HLA-G	Human leukocyte antigen-G
HOMA	Homeostasis model assessment of insulin resistance

IAA	Insulin autoantibodies
IADPSG	Association of Diabetes and Pregnancy Study Group
ICAM	Intracellular adhesion molecules
IGF-1	Insulin-like growth factor
IL-6	Interleukin-6
IR	Insulin resistance
IRS	Insulin receptor substrate 1
JAK2	Janus kinase 2
JNK	C-Jun N-terminal kinases
KDa	KiloDalton
LDL	Low density lipoprotein cholesterol
Mac	Macrophage
MCP-1	Monocyte chemoattractant protein 1
MMP	Matrix metalloproteinases
MODY	Maturity-onset diabetes of the young
mTOR	mammalian target of rapamycin
NAFLD	Nonalcoholic fatty liver disease
NDDG	Carpenter-Coustan and National Diabetes Data Group
NF-κB	Nuclear factor-κB
NGT	Normal glucose tolerance
NICE	National Institute for Health and Care Excellence
NO	Nitric oxide
NPH	Neutral protamine Hagedorn
OA	Osteoarthritis
OD	Optical density
OGTT	Oral glucose tolerance test
OSAS	Obstructive sleep apnoea syndrome
PCOD	Polycystic Ovary Disease

PED	Pre-existing diabetes
PIP3	Phosphoinositol-3, 4, 5-phosphate
PKC	protein kinase C
PPARγ	Peroxisome proliferator-activated receptors
ROC	Receiver operating characteristic
SMCs	Smooth muscle cells
STAT3	Signal transducer and activator of transcription 3
T1DM	Type 1 diabetes mellitus
T2DM	Type 2 diabetes mellitus
TC	Total Cholesterol
TG	Triglycerides
TNF-α	Tumor necrosis factor-α
VCAM	vascular adhesion molecules
VEGF	vascular endothelial growth factor
WHO	World Health Organization

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. The aim of our study was to evaluate serum omentin-1 levels in Gestational diabetes and assess its relation with glycemic control, insulin resistance and metabolic parameters. **Patients and Methods:** The study included 25 women with gestional diabetes was diagnosed according to the WHO 2013 criteria, 25 pregnant women with normal glucose tolerance and 25 healthy non pregnant female of matched age as a control group. They were subjected to full history taking and clinical examination. Fasting (blood glucose, insulin, lipid profile, and omentin-1) and 2 hour Oral glucose tolerance test with 75g glucose were measured. HOMA-IR was calculated. Data was analyzed and expressed in terms of mean ± SD. Pearson correlation was performed to study the correlation of serum omentin-1 in relation to glycemic control, insulin resistance and metabolic parameters in the studied groups. **Conclusion:** Serum Omentin was negatively correlated with fasting insulin level and HOMA-IR both in cases and in patient group. This suggests that Omentin has a role in insulin resistance. There was a high significant negative correlation between Omentin and glycemic control, total cholesterol, triglyceride and LDL (P value <0.01) and high significant positive correlation between Omentin and HDL (P value <0.01) in all studied groups. The best cut off point of serum omentin was 177.8 ng/ml to differentiate cases from controls using ROC curve analysis.

INTRODUCTION

INTRODUCTION

Gestational diabetes is carbohydrate intolerance of varied severity that begins or is first recognized during pregnancy, can affect up to 16–20% of all pregnancies ***(Bianchi et al., 2017).***

In the WHO 2013 diagnostic criteria, Gestational diabetes mellitus (GDM) should be diagnosed at any time in pregnancy if one or more of the following abnormality are met, fasting plasma glucose 92 – 125 mg/dl (5.1 – 6.9 mmol/l), one hour plasma glucose ≥180mg/dl (10mmol/l), 2-hour glucose153-199 mg/dl (8.5 -11 mmol/l) after overnight fasting with 75g glucose load ***(Thomas and Duarte-Gardea, 2017).***

Skeletal muscle is the principal site of whole-body glucose disposal, and along with adipose tissue, becomes severely insulin resistant during the latter half of pregnancy. Normal pregnancy is characterized by a ∼50% decrease in insulin-mediated glucose disposal in humans and a 200–250% increase in insulin secretion to maintain euglycemia in the mother ***(Qiao et al., 2017).***

GDM is caused by an imbalance between insulin resistance and insulin secretion during pregnancy which, historically, has been thought to occur when the pancreatic β cells fail to keep pace with the increasing insulin resistance that occurs during the second half of pregnancy ***(McCabe and Perng, 2017).***

Pregnant women with GDM increased risk of adverse pregnancy and infant outcomes, and in the long-term, they increase the risk of developing obesity, type 2 diabetes and cardiovascular disease in both the mother and child ***(Pang et al., 2017).***

Omentin is a 38-40 kDa adipokine which was identified from complementary DNA (cDNA) library in visceral omental adipose tissue ***(Escoté et al., 2017).***

There are two omentin genes, located adjacent to each other in the 1q22–q23 chromosomal region, which produce omentin-1 and omentin-2. Both isoforms show different pattern of tissue expression. In humans, omentin-1 is the predominant isoform in plasma and adipose tissue ***(Schleinitz, 2014).***

Omentin is a putative insulin sensitiser, while omentin concentrations are decreased in some insulin resistant states, such as polycystic ovary syndrome, and are down regulated by insulin and glucose ***(Delitala et al., 2017).***

The biological function(s) of omentin-1 in human pregnancy is not known, but it may have a role in regulating blood glucose levels; it enhances insulin-stimulated glucose uptake in human subcutaneous and visceral adipocytes ***(Dong et al., 2017).***

Maternal omentin-1 levels are higher in the first trimester to both the second trimester and the non-pregnant state. Higher omentin-1 in the first trimester of pregnancy may be due to increased fat accretion or reduced secretion from maternal adipose tissue later in pregnancy ***(Houldsworth et al., 2017).***

Aim of the work

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The aim of the study is to assess the relation between serum Omentin and insulin resistance in Gestational diabetes.

Review of literature