Relation between visceral obesity, Carotid Intima-Media Thickness and adenovirus 36 among female Adolescents

A Thesis

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Dedication

اهداء

To my mother , my husband , my lovely Son and my little sweetly Daughter,Their presence in my life gaining to me The power and cheering up to wake me up Every morning and continue in life.

"Wishing God bless them for me".

اهداء الى امى الغاليه وزوجى العزيز واولادى.

الى روح ابى فى الجنه ان شاء الله.

Dr. Walaa Saad

"قالُوا سُبْحَانك لاَ عِلْمَ لَنَا إلاّ ما عَلّمْتَنَا إنّكَ أنتَ الْعَلِيمُ الْحَكِيمُ"

سورة البقرة

الآية(٢٣)

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List of abbreviations

Abbreviation	Name
4AAP	**4-aminoantipyrine**
ADP	**Adenosine diphosphate**
adv36	**Human adenovirus36**
AMH	**Anti-Mullerian hormone**
ApoE	**Apolipoprotein E**
ARD	**Acute respiratory disease**
ATP	**Adenosine triphosphate**
BMI	**Body mass index**
BP	**Blood pressure**
CCR7	**C-chemokine receptor 7**
CCT	**Ciliocytophthoria**
CHD	**Coronary heart disease**
CHER	**Cholesterol esterase**
CHOD	**Cholesterol oxidase**
c-IMT	**Carotid intima-media thickness**
CM	**Chylomicron**
CPE	**Cytopathic effect**
CRF	**Cardiovascular risk factors**
CT	**Computed tomography**
CVD	**Cardiovascular disease**
DCs	**Dendritic cells**
DHEA	**Dehydroepiandrosterone**
DHEAS	**Dehydroepiandrosterone sulfate**
DL	**Dyslipidemia**
DM	**Diabetes mellitus**
E4-ORF1	**Early 4 open reading frame 1**
ELISA	**Enzyme-Linked Immunosorbent Assay**
ER	**Endoplasmic reticulum**

FSH	**Follicle-stimulating hormone**
GK	**Glycerol kinase**
Glut4 & Glut1	**Glucose transporters**
GnRH	**Gonadotropin releasing hormone**
H_2O_2	**Hydrogen peroxide**
HDL	**High-density lipoproteins**
HDLc	**HDL Cholesterol**
HOMA	**Homeostasis model assessment for insulin resistance**
HPG	**Hypothalamic-pituitary-gonadal**
HR	**Heart rate**
HSKM	**Human Skeletal Muscle**
HT	**Hypertension**
HTN	**Hypertension**
ICAM-1	**Intercellular adhesion molecule1**
IL-6	**Interleukin-6**
ILC2s	**Innate lymphoid cells**
IRS	**Insulin Receptor Substrate**
LDL	**Low density lipoprotein**
LH	**Luteinizing hormone**
LVH	**Left ventricular hyper-trophy**
MCP-1	**Macrophage receptor 1**
MetS	**Metabolic syndrome**
MRI	**Magnetic resonance imaging**
NAFLD	**Nonalcoholic fatty liver disease**
NF-B	**Nuclear factor-B**
OWO	**Overweight/obesity**
PEGME	**Polyethylene-glycol-methyl ether**
PI3K	**Phosphoinositide 3-kinase**
PPARγ	**Peroxisome proliferator activated receptor-γ**

PVS	**Polyvinyl sulfonic acid**
SF	**Skin fold thickness**
SFA	**Subcutaneous fat area**
T2D	**Type 2 diabetes**
TNF-*α*	**Tumor necrosis factor-*α***
VFA	**Visceral fat area**
VLDL	**Very low-density lipoprotein**
WC	**Waist circumference**
WHR	**Waist to hip ratio**
WHTR	**Waist to height ratio**

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Carotid Intima-Media Thickness in visceral obese Egyptian female adolescents with adenovirus 36 infection

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Abstract

Background: Increased carotid intima-media thickness (cIMT), a marker of early-onset atherosclerosis, has been observed in obese adolescents. Recently the viral infection increased interest in obesity-related studies, especially adenovirus 36.

Aim: To investigate the relationship between cIMT, visceral obesity and adenovirus 36 infection in female adolescents. **Study Design**: A cross-sectional study included 90 females aged 12-15 years. It was conducted at the "Medical Excellence Research Center (MERC)" of the "National Research Centre" (Approval No.15089), during the period between September 2016 and November 2017. Anthropometric assessment was done. Visceral obesity was measured by abdominal ultrasound. cIMT for both carotid arteries were measured by high-resolution echo-Doppler. Qualitative Human adenovirus 36 antibody was assessed using ELISA.

Results: Girls with visceral obesity had higher frequency of increased cIMT at left (96.2% versus75%) and right carotid artery (84.6% versus 73.4%), and adenovirus 36 sero-positive antibodies than among those without visceral obesity $p<0.01$.Visceral obesity; among total sample; had significant positive correlations with BMI, waist and hip circumference. While it had insignificant correlations with age, cIMT at both right and left carotid arteries and adenovirus 36.

Conclusions: The frequency of increased cIMT at left carotid artery was higher among girls with visceral obesity than among those without visceral obesity. Visceral obesity, cIMT at right & left carotid arteries, and Adenovirus-36 had insignificant correlations with each others.

Keywords: **carotid intima-media thickness - Visceral obesity – adenovirus 36.**