بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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MONA MAGHRABY

Epicardial Fat Volume Assessed by Multi-Detector Computed Tomography and it's Relation with the Severity of Coronary Artery Disease

Thesis

Submitted for Partial Fulfillment
of Master Degree in **Cardiology**

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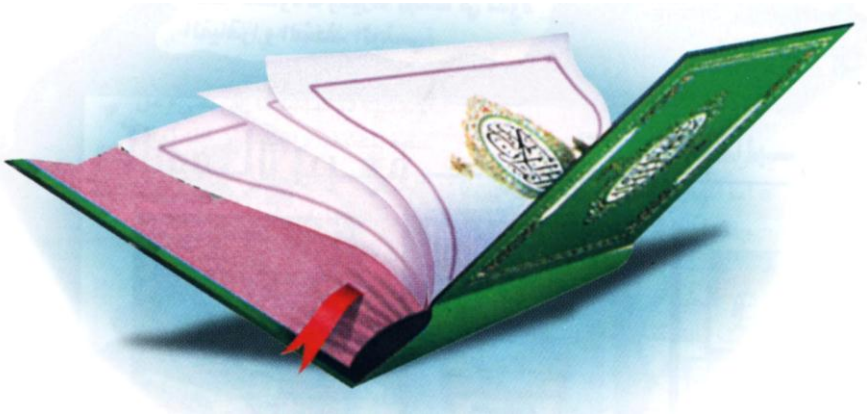
بسم الله الرحمن الرحيم

وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ
عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ



صدق الله العظيم

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Mohamed Mohamed Ali

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List of Abbreviations

Abb.	Full term
ACC	*American college of cardiology*
ADA	*American diabetes association*
AHA	*American heart association*
ANOVA	*Analysis of variances*
BMI	*Body mass index*
CABG	*Coronary artery bypass graft*
CAC	*Coronary artery calcium*
CAD	*Coronary artery disease*
CRP	*C-reactive protein*
CT	*Computed tomography*
CTA	*Computed tomography angiography*
CVD	*Cardiovascular disease*
CVS	*Cerebrovascular stroke*
DM	*Diabetes mellitus*
EAT	*Epicardial adipose tissue*
EBCT	*Electron beam computed tomography*
ECG	*Electrocardiography*
EFV	*Epicardial fat volume*
FFA	*Free fatty acids*
FFRCT	*Fractional flow reserve computed tomography*
FH	*Family history*
GLUT	*Glucose transporter*
HDL	*High density lipoproteins*
HTN	*Hypertension*
HU	*Hounsfield unit*
ICA	*Invasive coronary angiography*
IL	*Interleukin*
LAD	*Left anterior descending coronary artery*
LCX	*Left circumflex coronary artery*
LDL	*Low density lipoproteins*
LM	*Left main coronary artery*

List of Abbreviations cont...

Abb.	Full term
MAPK	*Mitogen activated protein kinase*
MDCT	*Multi-detector computed tomography*
MRA	*Magnetic resonance angiography*
MRI	*Magnetic resonance image*
MSCT	*Multi-slice computed tomography*
PC	*Personal computer*
PCI	*Percutaneous coronary intervention*
PDA	*Posterior descending coronary artery*
PL	*Posterior-lateral coronary artery*
PTP	*Pretest probability*
PVD	*Peripheral vascular disease*
RCA	*Right coronary artery*
ROS	*Reactive oxidative species*
SCAD	*Stable coronary artery disease*
SD	*Standard deviation*
SIS	*Segment involvement score*
SPECT	*Single photon emission computed tomography*
SPSS	*Statistical package for the social sciences*
SSS	*Segment stenosis score*
TG	*Triglyceride*
TNF	*Tumor necrosis factor*
VAT	*Visceral adipose tissue*
WAT	*White adipose tissue*

INTRODUCTION

The distribution of body fat varies among individuals and may be as important as the amount of body fat in determining risk. In fact, excess accumulation of fat around the upper body is associated with a higher risk of coronary heart disease regardless of total body fat ***(Rimm et al., 1995)***.

Epicardial fat is defined as the adipose tissue located between the outer wall of the myocardium and the visceral layer of pericardium, surrounding the heart and the coronary vessels. Blood supply of epicardial fat is small myocardial coronary arteries ***(Sacks and Fain, 2007)***.

Anatomically, epicardial adipose tissue (EAT) is mainly present in the atrioventricular and interventricular grooves, following the course of the main coronary vessels, and present over the free wall of the right ventricle and left ventricular apex ***(Iacobellis et al., 2005)***.

Pathophysiologically, EAT is closely related to the adventitia of the coronary arteries without a barrier. So, EAT secrete several pro-atherogenic mediators (adipokinase, adiponectin, resistin and inflammatory cytokines) that may directly influence the development and progression of atherosclerosis and coronary artery disease (CAD) through a local paracrine and endocrine effect ***(Mazurek et al., 2003; Baker et al., 2006)***.

A previous studies had suggested that fat disposition in visceral organs and epicardial tissue may be related to metabolic risk factors and a predictor of the severity of CAD and the extent of coronary artery atherosclerosis ***(Bettencourt et al., 2012; Mahabadi et al., 2013)***.

EAT can be measured with simple echocardiography on free wall of right ventricle with correlation with presence of atherosclerotic CAD on conventional coronary angiography.

Other imaging modalities for measurement of EAT are magnetic resonance imaging (MRI) and multi-slice computed tomography (MSCT) ***(Jeong et al., 2007; Mclean and Stllman; 2009)***.

Unlike echocardiography, MSCT is capable of simultaneous demonstration of coronary calcium score, obstructive versus non-obstructive coronary lesions and also amount of epicardial fat volume (EFV) ***(Sarin et al., 2008)***.

A recent study demonstrated that 64-slice (MSCT) is suitable for volumetric quantification of EAT with higher reproducibility than measurements of EAT thickness by echocardiography, and that excessive accumulation of EAT was associated with obesity and metabolic syndrome ***(Saura et al., 2010; Gorter et al., 2007)***. MSCT provides note-worthy information about coronary arteries including not only the presence and degree of stenotic lesions but also of subclinical

atherosclerotic plaques ***(Jinzaki et al., 2008; Jinzaki et al., 2009)***.

Finally, by resolving the role of epicardial fat in the etiology of atherosclerosis may eventually serve as a basis for developing therapeutic or preventive strategies for atherosclerosis.