

**The Relationship between The Carotid Intima-Media Thickness, Coronary Risk Factors, C-Reactive Protein and Peripheral Circulation among Elderly Diabetic Patients**

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## **LIST OF ABBREVIATIONS**

2hsPP	<i>2 hours postprandial blood sugar.</i>
ABI	<i>Ankle brachial index.</i>
ADL	<i>Activities of daily living.</i>
BMI	<i>Body mass index.</i>
CAD	<i>Coronary artery disease.</i>
CHD	<i>Coronary heart disease.</i>
CIMT	<i>Carotid intima-media thickness.</i>
COPD	<i>Chronic obstructive pulmonary disease.</i>
CRP	<i>C-reactive protein.</i>
CVD	<i>Cardiovascular disease.</i>
DBP	<i>Diastolic blood pressure.</i>
DM	<i>Diabetes mellitus.</i>
ELISA	<i>Enzyme linked immunosorbant assay.</i>
FBS	<i>Fasting blood sugar</i>
GDS	<i>Geriatric depression scale.</i>
HDL	<i>High density lipoprotein.</i>
HS-CRP	<i>High sensitivity C-reactive protein level.</i>
IADL	<i>Instrumental activities of daily living.</i>
IMT	<i>Intima-media thickness.</i>
IR	<i>Insulin resistance.</i>
IRS	<i>Insulin resistance syndrome.</i>
LDL	<i>Low density lipoprotein.</i>
LT ABI	<i>Left ankle brachial index.</i>

LT CIMT	<i>Left common carotid artery intima-media thickness.</i>
M	<i>Mean.</i>
MABI	<i>Mean ankle brachial index.</i>
MCIMT	<i>Mean carotid intima-media thickness.</i>
MI	<i>Myocardial infarction.</i>
MMSE	<i>Mini-Mental State Examination.</i>
MS	<i>Metabolic syndrome.</i>
MRA	<i>Magnetic resonance angiography.</i>
MRI	<i>Magnetic resonance imaging.</i>
NO	<i>Nitric oxide.</i>
PAD	<i>Peripheral arterial disease.</i>
PVD	<i>Peripheral vascular disease.</i>
RT ABI	<i>Right ankle brachial index.</i>
RT CIMT	<i>Right common carotid artery intima-media thickness.</i>
SBP	<i>Systolic blood pressure.</i>
SD	<i>Standard deviation.</i>
SLP	<i>Segmental limb pressure.</i>
SPSS	<i>Statistical Package of Social Science.</i>
T2D	<i>Type 2 diabetes.</i>
T CHO	<i>Total cholesterol.</i>
TIA	<i>Transient ischemic attack.</i>
TG	<i>Triglycerides.</i>
VLDL	<i>Very low density lipoprotein.</i>



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# ***INTRODUCTION***

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# **Introduction**

Diabetes mellitus (DM) is a widespread disease with a great social impact. The quality of life and the life span of the patients with diabetes mellitus depend on its complications (*Goycheva et al., 2006*).

Diabetes mellitus prevalence for all age groups worldwide was estimated to be 2.8% in 2000 and is expected to be 4.4% in 2030 (*Sarah et al., 2004*). Egypt is in the world's top 10 in terms of the highest number of people with diabetes in 2003 (3.9 million) and highest projected number of people with diabetes in 2025 (7.8 million) (*International Diabetes Federation, 2003*)

Persons with DM are at an increased risk for atherosclerosis which is responsible for CVD (CHD, PAD, or cerebrovascular disease) (*Adler et al., 2002*) and its clinically evident is preceded by preclinical arterial wall changes which are characterized by increased thickness of the internal and medial membrane of the arterial wall (intima-media thickness – IMT) (*Held et al., 2001*) and that is known as a marker of atherosclerosis in coronary or lower limb arteries (*Graner et al., 2006*).

Inflammation play an important role in pathogenesis of atherosclerosis (*Libby, 2002*) as several studies found that C-reactive protein (CRP) level is correlated with sub clinical atherosclerosis (*Lucas et al., 2006*).

Peripheral arterial disease refers to the atherosclerotic disease of the extremities. In the elderly PAD is important because it is an independent risk factor for vascular disease in other regions, resulting in increased rate of cardiovascular events and mortality; also it adversely affects the functional status of the elderly and lastly its prevalence increases with age (*Krishnaswamy et al., 2006*). The most efficient, objective and practical

## ***Introduction***

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means of documenting presence and severity of PAD is measurement of ankle brachial index (ABI) (*Belch et al., 2003*).

Studies found that in patients with PAD, the prevalence of coronary artery disease (CAD) ranges from 20% to 60% when based on medical history, physical examination, and electrocardiography, therefore ABI which is non-invasive and simple measure of PAD can be correlated with CAD (*Murabito et al., 2002*).

Coronary artery disease is a multifactorial disease with both environmental and genetic risk factors contributing to its development. The most important risk factors are age, male sex, smoking, high blood pressure, type 2 diabetes (T2D) and elevated total cholesterol levels (TCHO) and triglycerides (TG) (*Goldman and Ausiello, 2004*). These risk factors are implicated also in the development of PAD (*Krishnaswamy et al., 2006*) also IMT is increased in groups of patients with several cardiovascular risk factors and it has proved to be an independent risk factor for cardiac infarction and stroke (*Poredos, 2004*).



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## ***AJM OF THE WORK***

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## **Aim of the Work**

The aim of this thesis is to study the correlation between the carotid intima-media thickness, coronary risk factors (such as age, male sex, smoking, high blood pressure and elevated blood cholesterol levels), the inflammatory mediator C-reactive protein and peripheral arterial disease among elderly diabetic patients.