Adiponectin in patients with Coronary Artery Disease

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Abstract

Coronary heart disease represent a major cause of death worldwide. Adiponectin is an important adipocytokine that shows a number of antiatherogenic and insulin sensitizing effects. Measurement of Adiponectin may be a helpful tool for assessment of the risk of CAD and may represent a novel diagnostic tool for risk stratification of patients with myocardial ischaemia. Adiponectin is an independent predictor of coronary artery disease.

Key words : (Adiponectin, Coronary artery disease)

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List of Abbreviations

Abbreviation	Full Name
ACC	Acetyl coenzyme-A carboxylase
Acrp٣٠	Adipocyte complement-related protein of ٣٠ kDa
ACS	Acute coronary syndrome
Adipo R١	Adiponectin receptor ١
Adipo R٢	Adiponectin receptor ٢
AMI	Acute myocardial Infarction
AMPK	Adenosine monophosphate protein kinase
APM١	Adipose most abundant gene transcript ١
BMI	Body mass index
CAD	Coronary artery disease
cAd	Collegenous domain of adiponectin
cDNA	Complementary DNA
CHD	Coronary heart disease
CK	Creatine kinase
CK-MB	Creatine kinase muscle – brain fraction
CRP	C-reactive protein
cTnT	Cardiac Troponin T
cTnI	Cardiac Troponin I
ECG	Electrocardiogram
ELISA	Enzyme Linked Immunosorbent Assays
eNO	Endothelial nitric oxide
fAd	Full-length Adiponectin protein
FFA	Free fatty acids
FGF	Fibroblast growth factor
G٦Pase	Glucose-٦- phosphatase
gAd	Globular domain of adiponectin
GBP٢٨	Gelatin binding protein of ٢٨ kDa
GLUT ٤	Glucose transporter ٤
HB EGF	Heparin-binding epidermal growth factor-like growth factor
HDL	High density lipoprotein
hFABP	Heart type Fatty Acid Binding Protein

HMW	High molecular weight
HRP	Horse raddish peroxidase
hsCRP	High sensitivity assay of CRP
ICAM-١	Intracellular adhesion molecule-١
IDF	International Diabetes Federation
IDL	Intermediate density lipoprotein
IL	Interleukin
LDH	Lactate dehydrogenase
LDL	Low density lipoprotein
LMW,	Low molecular weight
LP(a)	Lipoprotein (a)
MAPK	Mitogen activated protein kinase
MHC	Major histocompatibility complex
MI	Myocardial infarction
MMW	Medium molecular weight
mRNA	Messenger RNA
NAD	Nicotineamide adenine dinucleotide
NADH	Reduced Nicotineamide adenine dinucleotide
NADPH	Reduced Nicotineamide adenine dinucleotide phosphate
NCEP	National Cholesterol Education Program
NO	Nitric oxide
NSTEMI	Non- ST Elevation Myocardial Infarction
O.D.	Optical density
oxLDL	Oxidized low-density lipoprotein
PAI-١	Plasminogen activator inhibitor-١
PDGF-BB	Platelet-derived growth factor BB
PEPCK	Phosphoenolpyruvate carboxykinase
PPARα	Peroxisome proliferator activated receptor
RIA	Radioimmunometric Assay
ROS	Reactive oxygen species
SAP	Stable angina pectoris
SDS-PAGE	Sodium dodecyl sulfate poly acrylamide gel electrophoresis
STEMI	ST Elevation Myocardial Infarction
TG	Triglycerides
TGF-β	Transforming growth factor B
Th١	T Helper ١ cells
Th٢	T helper ٢ cells

TIMP-١	Tissue inhibitor of metalloproteinase-١
TMB	Trimethyl benzidine
TNF alpha	Tumour necrosis factor alpha
TnI	Troponin I
TnT	Troponin T
UAP	Unstable angina pectoris
UA/NSTEMI	Unstable angina versus Non- ST Elevation Myocardial Infarction
VCAM-١	Vascular-cell adhesion molecule ١
VLDL	Very low density lipoprotein
WAT	White adipose tissue
WHO	World Health Organization

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Introduction and Aim of work

Coronary artery disease (CAD) is a major cause of death worldwide **(Murray et al., ١٩٩٧ and Ohashi et al., ٢٠٠٤).** It is expected that the rate of CAD will accelerate in the next decade, contributed to by:

- aging of the population
- alarming increases in the worldwide prevelance of obesity, type ٢ diabetes, and the metabolic syndrome
- increasing cardiovascular risk factors among younger generations **(Bonow et al., ٢٠٠٢)**.

American heart association, ٢٠٠٤ reported that the lifetime risk of developing symptomatic CAD after the age of ٤٠ is ٤٩٪ for men and ٣٢٪ for women**.** These facts force us to study cardiovascular disease and consider new strategies for prediction and prevention.

Atherosclerosis is considered as the main cause of CAD. The whole spectrum of coronary artery disease evolves through various events leading to the formation and progression of atherosclerotic plaque and finally its complications. It has been suggested that atherosclerosis is a multifactorial, multistep disease that involves chronic inflammation at every step, from initiation to progression, and that all the risk factors contribute to pathogenesis by aggravating the underlying inflammatory process **(Mallika et al., ٢٠٠٧).**

Kershaw and Flier, ٢٠٠٤ suggested that the adipose tissue may play an important role in mediating the chronic inflammatory process and, subsequently, cardiovascular disease risk**.** Increasing evidence supports that the adipose tissue may have an active endocrine function producing several hormones and substances known as adipocytokines **(Yamauchi et al., ٢٠٠٢; Rothenbacher et al., ٢٠٠٥).**

Adiponectin is an adipocytokine that is believed to have significant antiatherogenic and antiinflammatory properties **(Wolk et al., ٢٠٠٧)**. It appears to be a clinically important protein in the process of atherosclerosis (**Von Eynatten et al., ٢٠٠٦**). Physiologic levels of adiponectin are necessary to maintain the normal, noninflammatory state of the vascular wall **(Hotta et al. ٢٠٠٠; Ouchi et al. ٢٠٠٠ and Ouedraogo et al., ٢٠٠٧)** through acting as an endogenous modulator of both macrophage to foam cell transformation and endothelial inflammatory response (**Nakamura et al., ٢٠٠٤).**

Low adiponectin has been linked to the presence of CAD and has been shown to be a risk factor for cardiovascular events **(Wolk et al., ٢٠٠٧).** Adiponectin serum levels can be considered as an interesting tool in the risk stratification of CAD, to identify at an early stage, subjects in whom preventive strategies should be more aggressive **(Tarquini et al., ٢٠٠٧).**

Aim of work

The aim of this study is to investigate whether circulating concentrations of plasma adiponectin may constitute a significant coronary risk factor and the relation between plasma concentrations of adiponectin and various subgroups of CAD patients including SAP group (stable angina pectoris) and ACS group (acute coronary syndrome) [ACS includes UAP/NSTEMI group (unstable angina pectoris versus non- ST elevation myocardial infarction) & STEMI group (ST elevation myocardial infarction)].