The association between serum selenium and Ischemic Heart Disease among patients with type2 Diabetes Mellitus.

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ABSTRACT

Selenium is an important component of the antioxidant enzyme, glutathione peroxidase (GSH-Px) that protects cells from the adverse effects of free radicals and lipid peroxides. A deficiency of selenium lowers the tissue activity of GSH-Px which in turn may have unfavorable effects on lipoprotein and arachidonic acid metabolism**.** These metabolic changes associated with compromised selenium status may lead to damage of the vascular endothelium and increased platelet adhesion which increase the risk of atherosclerotic heart disease.

Since selenium mediates a number of insulin-like actions both in vivo and in vitro, this may be a potential mechanism for these actions.

These data suggest that selenium may be beneficial in insulin resistance and potentially can modify the risk of diabetes and Ischemic Heart Disease (IHD) among patients with type 2 diabetes mellitus.

The aim of this study is to evaluate the association between serum selenium and IHD among patients with type2 diabetes.

20 type2 diabetic patients with Ischemic Heart Disease (IHD), 20 type2 diabetic patients without Ischemic Heart Disease (IHD), 10 healthy controls were studied.

It was concluded that Serum selenium is not significantly lower in type 2 diabetic patients (ischemic and non ischemic) than healthy control and the association between serum selenium and IHD in diabetic patients is not significant.

Keywords:

IHD: ischemic heart disease

DM: diabetes mellitus

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List of Abbreviations

ADA	*American Diabetes Association*
AGEs	*Glycation End Products*
AI	*Adequate Intake*
AIDS	*Acquired Immune deffeciency Syndrome*
AMP	*Adenosine Monophosphate*
ATP	*Adenosine Triphosphate*
ATPIII	*Adult Treatment Panel III*
CAD	*Coronary Artery Disease*
CD4	*Cluster of Differentiation 4*
CNS	*Central Nervous System*
CVD	*Cardiovascular disease*
DAG	*D*iacylglycerol
DM	*Diabetes Mellitus*
DCCT	*Diabetes Control and Complications trial*
DRI	*Dietary Reference Intake*
DV	*Daily Value*
ED	*Erectile Dysfunction*
eNOS	endothelial nitric oxide synthase
ESRD	*End-Stage Renal Disease*
FAD	*Flavin Adenine Dinucleotide*
FAS	*Fatty Acid Synthase*
FDA	*Food and Drug Administration*
FFA	*Free Fatty Acid*

FMN	*Flavin Mononucleotide*
FPG	*Fasting Plasma Glucose*
G6PDH	*Glucose-6-Phosphate Dehydrogenase*
GAD ♀♀	*Glutamic Acid Decarboxylase*
GCT	*Glucose Challenge Test*
GDM	*Gestational Diabetes Mellitus*
GLUT 1	*Glucose Transporter 1*
GUSTO-I	*Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries*
GSH	*Glutathione*
GSHPx	*Glutathione Peroxidase*
HDL	*High-Density Lipoprotein*
HIV	*Human Immune deffeciency Virus*
HLA	*Human Leucocytic Antigen*
HNF-1α	*Hepatocyte Nuclear Factor1α*
HNF	*Hepatocyte Nuclear Factor*
Hb_{A1c}	*Glycosylated Haemoglobin*
IκB	*Inhibitory Protein kappa B*
IAAs	Autoantibodies to Insulin
ICAs	*Islet Cell Autoantibodies*
IGT	*Impaired Glucose Tolerance*
IkκB	*Inhibitory Protein Kinase kappa B*
INTERMAP	*International Population Study on Macronutrients and BP*

IV	*IntraVenous*
JNK	*NH_2-Terminal Jun Kinases*
LDL	*Low-Density Lipoprotein*
MAP	*Mitogen-Activated Protein*
MAPK	*Mitogen-Activated Protein Kinase*
MI	*Myocardial Infarction*
MODY	*Maturity-Onset Diabetes of the Young*
mRNA	*Messenger RNA*
MnSOD	Manganese Superoxide Dismutase
NAC	*N-Acetyl-L-Cysteine*
NHANES	*National Health and Nutrition Examination Survey*
NCEP	*National Cholesterol Education Program*
NIDDM	*Non-Insulin Dependent Diabetes Mellitus*
NFκB	*Nuclear Factor kappa B*
NO	*Nitric Oxide*
NOS	Nitric Oxide Synthase
OGTT	*Oral Glucose Tolerance Test*
PAI-1	*Plasminogen Activator Inhibitor-1*
PARP	Poly (Adenosine DiPhosphate)-Ribose Polymerase
PEPCK	*Phosphoenolpyruvate Carboxykinase*
PKC	*Protein Kinase C*
RAGE	*Receptors for Advanced Glycation End Products*

RDA	Recommended Dietary Allowances
RNS	*Reactive Nitrogen Species*
ROS	*Reactive Oxygen Species*
SAPK	*Stress Activated Protein Kinases*
SOD	superoxide dismutase
TAMI	*Thrombolysis and Angioplasty in Myocardial Infarction trials*
TNF-α	*Tumor Necrosis Factor-α*
TPN	*Total Parenteral Nutrition*
UL	*Upper intake Level*
UKPDS	*United Kingdom Prospective Diabetes Study*
US	*United States*
USA	*United States of America*
VEGF	*Vascular Endothelial Growth Factor*
VLDL	*Very Low Denisity Lipoprotiens*
VSMC	*Vascular Smooth Muscle Cells*

Review of Literature

Diabetes Mellitus

Definition & classification

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels **(American Diabetes Association 2006).**

Table 1. Etiologic classification of diabetes mellitus

Type 1 diabetes mellitus Beta cell destruction, usually leading to absolute insulin deficiency • Immune mediated • Idiopathic
Type 2 diabetes mellitus May range from predominant insulin resistance with relative insulin deficiency to predominant secretory defect with insulin resistance
Gestational diabetes mellitus Onset or recognition of glucose intolerance in pregnancy
Other specific types

Genetic defects of beta cell function	-Infections
-Chromosome20, HNF-4alpha (formerly MODY1)	Congenital rubella
-Chromosome 7, glucokinase (formerly MODY2)	Cytomegalovirus
-Chromosome 12, HNF-1alpha (formerly MODY3)	Others
-Mitochondrial DNA	-Uncommon forms of immune-mediated diabetes:
-Others	Anti-insulin receptor antibodies
Genetic defects in insulin action	'Stiff-man' syndrome
Alstrom syndrome	Others
Leprechaunism	-Drug or chemical induced:
Lipoatrophic diabetes	Atypical antipsychotics
Rabson-Mendenhall syndrome	Beta-adrenergic agonists
Type A insulin resistance	Diazoxide
	Glucocorticoids
Others	Interferon alfa
Diseases of the pancreas	Nicotinic acid
Cystic fibrosis	Pentamidine
Fibrocalculous pancreatopathy	Phenytoin
Hemochromatosis	Protease inhibitors
Neoplasia	Thiazide diuretics
Pancreatitis	-Others:
Trauma/pancreatectomy	Other genetic syndromes sometimes associated with diabetes:
Others	Down syndrome
Endocrinopathies	Friedreich's ataxia
	Huntington's chorea
	Klinefelter syndrome