

**Association of Cardiac Function and Endothelial
Dysfunction with Osteoprotegerin in Children and
Adolescents with Type 1 Diabetes Mellitus**

Thesis

**Submitted for partial fulfillment for Master Degree in
Pediatrics**

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List of abbreviations

ACE	: angiotensin converting enzyme
ACR	: albumin/creatinine ratio
ADA	: American Diabetes Association
AGEs	: advance glycation end products
aIMT	: aortic intimal medial thickness
A LV	: peak mitral atrial velocity during late diastole of left ventricle
Am	: peak late diastolic myocardial velocity of left ventricle
AMI	: acute myocardial infarction
AO	: aortic diameter
A RV	: peak mitral tricuspid velocity during late diastole of right ventricle
At	: peak late diastolic myocardial velocity of right ventricle
BA	: brachial artery
bFGF	: basic fibroblast growth factor
BG	: blood glucose
BMI	: Body mass index
BSA	: bovine serum albumin

List of abbreviations

CAD	:coronary artery disease
cIMT	:carotid intimal medial thickness
CHD	:chronic heart disease
cm/sec	:centimeter per second
CSII	:Continuous subcutaneous insulin infusion
CVD	:cardiovascular disease
DBP	:diastolic blood pressure
DCCT	:the Diabetes Control and Complications Trial
DM	:Diabetes Mellitus
DKA	:diabetic ketoacidosis
DT LV	:deceleration time of left ventricle
DT RV	:deceleration time of right ventricle
ECD	:Endothelial cell dysfunction
EDV	:end diastolic volume
Ef	:ejection fraction
ELISA	:enzyme Linked immunosorbant assay
E LV	:peak early mitral filling velocity of left ventricle
E RV	:peak early tricuspid filling velocity of right ventricle

List of abbreviations

Em	:peak early diastolic myocardial velocity of left ventricle
ESV	:end systolic volume
Et	:peak early diastolic myocardial velocity of right ventricle
FDCR-1	:follicular dendritic cell-associated receptor 1
FMD	:flow-mediated dilation
Fs	:fractional shortening
FT1DM	:fulminant type 1 diabetes mellitus
HbA1c	:Glycosylated hemoglobin
HC	: Hip circumference
HDL	:high-density lipoprotein cholesterol
HF	:heart failure
HLA	:human leucocyte antigen
HNF	:Hepatocyte nuclear factor
HS	:highly significant
ISPA	:International Society for Pediatric and Adolescent Diabetes
IMT	:intima-media thickness
IVRT LV	:isovolumic relaxation time of left ventricle
IVRT RV	:isovolumic relaxation time of right ventricle

List of abbreviations

LADA	:Latent Autoimmune Diabetes of the Adult
LAD	:left atrial diameter
LDL	:low-density lipoprotein cholesterol
LVEDD	:left ventricular end diastolic dimension
LVESD	:left ventricular end systolic dimension
LVMI	:left ventricular mass index
MODY	: Maturity onset diabetes of the young
ms	:milliseconds
NO	:nitric oxide
NOD	:non-obese diabetic
NPH	:Neutral Protamine Hagedom insulin
NS	:non significant
OCIF	:osteoclastogenesis inhibitory factor
OPG	:osteoprotegerin
PAD	:Peripheral Artery Disease
PDGF	:platelet-derived growth factor
PPARγ	:peroxisome proliferator-activated receptor gamma
PWT	:posterior wall thickness
QUICKI	:Quantitative Insulin Sensitivity Index
RANKL	:Receptor Activator for Nuclear Factor κ B Ligand

List of abbreviations

RVESP	:right ventricular end systolic pressure
RVMI	:right ventricular mass index
S	:significant
SBP	:systolic blood pressure
SD	:standard deviation
SDS	:standard deviation score
siRNA	:short interfering RNA
Sm	:peak systolic myocardial velocity of left ventricle
SMBG	:self-monitoring of blood glucose
SMR	:standardized mortality rate
sRANKL	:soluble receptor activator of nuclear factors- κ B ligand
St	:peak systolic myocardial velocity of right ventricle
SV	:Stroke volume
SWT	:septal wall thickness
T1D	:Type 1 diabetes mellitus
T2D	:type 2 diabetes mellitus
TC	:Total cholesterol
TDI	:Tissue Doppler Imaging

List of abbreviations

TG	:Triglycerides
TNF	:tumor necrosis factor
TRAIL	:TNF-related apoptosis inducing ligand
VECs	:vascular endothelial cells
VSMCs	:vascular smooth muscle cells
WC	:Waist circumference
WHO	:world health organization
WHR	:waist to hip ratio

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