Asymptomatic Carotid Atherosclerosis & Silent Brain Infarction in Patients with Metabolic Syndrome

Thesis

Submitted for complete fulfillment of M.Sc. degree in Neurology and Psychiatry

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بسم الله الرحمن الرحيم

وقُلِ اعملُواْ فَسيرى اللّه عملكُم ورسولُه والْمؤمنونَ وستردونَ إِلَى عالمِ الْغيبِ والشهادة فَينبئُكُم بِما كُنتم تعملُونَ

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لجنة المناقشة والحكم على رسالةالماجستير المقدمه من الطبيب / شريف حسن علوان زكى
توطئـه للحصـول على درجـة الماجستيـر فى الأمراض العصبية والمشكلة
بقرار من مجلس الكلية والمعتمـد من السيد الأستاذ الدكتور/ نائب رئيس الجامعة
للدراسات العليا

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Dedication

To my father: Prof. Dr. Hassan Zaki Elwan, in hopes that I didn't disappoint you.

May you rest in peace and may I be so lucky as to become the smallest possible version of the great man that you once were.

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List of abbreviations

AACE	American academy of clinical endocrinologists
ACA	Anterior cerebral artery
ACE	Angiotensin converting enzyme
ADA	American diabetes association
ad-LA	Advanced leukoaraiosis
ADMA	Asymmetric dimethylarginine
AF	Atrial fibrillation
AHA	American heart association
ANS	Autonomic nervous system
Apo-A I	Apolipoprotein A I
Apo-B	Apolipoprotein B
Apo-C III	Apolipoprotein C III
Apo-E	Apolipoprotein E
ARIC study	Atherosclerosis risk in communities study
ATP-III	Adult treatment panel III
ATPase	Adenosine triphosphatase
BA	Basilar artery
Bl. P. / BP	Blood pressure
BMI	Body mass index

Ca	Calcium
CARESS	Clopidogrel and Aspirin for reduction of emboli in symptomatic carotid stenosis
CCA	Common carotid artery
CD	Cluster of differentiation
CDC	Centers for disease control and prevention
CEA	Carotid endarterectomy
CEUS	Contrast enhanced ultrasonography
CHD	Coronary heart disease
CHS	Cardiovascular health study
CLAIR	Clopidogrel plus Aspirin for infarction reduction study
CPR	Curved planar reformat
CO	Cardiac output
COX	Cyclo-oxygenase
CRP	C reactive protein
CSF	Cerebrospinal fluid
CT	Computed tomography
CTA	Computed tomographic angiography
CVD	Cardiovascular disease
DM	Diabetes mellitus
DMT2	Diabetes mellitus type 2

DSA	Digital substraction angiography
dVRS	Dilated Virchow Robin spaces
DWI	Diffusion weighted image
ECA	External carotid artery
ECAD	Extracranial atherosclerotic disease
EDRF	Endothelial derived relaxing factor
EGF	Epidermal growth factor
EGIR	European group for the study of Insulin resistance
FC	Fibrous cap
FDA	Food and drug administration
FFAs	Free fatty acids
FLAIR	Fluid attenuated inversion recovery
FPG	Fasting plasma glucose
FRS	Framingham risk score
GC	Glucocorticoid
g-GT	Gamma glutamyl transferase
GH	Growth hormone
GI	Glucose intolerance
GM	Grey matter
Hb-1Ac	Glycosilated hemoglobin
HDL-C	High density lipoproteins cholesterol

HHCY	Hyperhomocystinemia
HLA	Human leucocytic antigen
HOMA-IR	Homeostatic model assessment of insulin resistance
HPA axis	Hypothalamo pituitary adrenal axis
hs-CRP	High sensitivity C reactive protein
HSD	Hydroxysteroid dehydrogenase
HTN	Hypertension
ICA	Internal carotid artery
ICAD	Intracranial atherosclerotic disease
ICAM	Intercellular adhesion molecule
ICD	International classification of disease
ICS	Intracranial stenosis
IDF	International diabetes federation
IFG	Impaired fasting glucose
IGT	Impaired glucose tolerance
IHD	Ischemic heart disease
IL	Interleukin
IMT	Intima media thickness
IR	Insulin resistance
IRS	Insulin receptor substrate
ISSYS	Investigating silent strokes in hypertensives

IVF	In vitro fertilization
LA	Leukoaraiosis
LDL-C	Low density lipoprotein cholesterol
LpA	Lipoprotein A
LP-PLA2	Lipoprotein associated phospholipase A2
MAP	Mitogen activated protein
MCA	Middle cerebral artery
MCP	Monocyte chemotactic protein
MetS	Metabolic syndrome
MI	Myocardial infarction
mi-RNA	Micro RNA
MMPs	Matrix metalloproteinases
MRA	Magnetic resonance angiography
MRI	Magnetic resonance imaging
MRIPH	MRI defined plaque hemorrhage
mRNA	Messenger RNA
MRP	Myeloid related protein
NADP	Nicotinamide adenine dinucleotide phosphate
NCEP	National cholesterol education program
NF-Kb	Nuclear factor Kb
NHLBI	National heart, lung and blood institute

NIH	National institutes of health
NIHSS	National institutes of health stroke scale
NIVE	Non invasive vascular elastography
NKT	Natural killer T cells
NO	Nitric oxide
NOS	Nitric oxide synthase
OSS	Oscillatory shear stress
PAI-1	Plasminogen activator inhibitor 1
PCA	Posterior cerebral artery
PD	Proton density
PDGF	Platelet derived growth factor
PET	Positron emission tomography
PI	Phosphatidylinositol
Pl. GF	Placental growth factor
PSGL	P selectin glycoprotein ligand
PTAS	Percutaneous transluminal angioplasty and stenting
P value	Probability value
PWMLs	Periventricular white matter lesions
ROS	Reactive oxygen species
SAMMPRIS	Stenting and aggressive medical management for preventing recurrent stroke in intracranial stenosis trial

SBI	Silent brain infarction
SD	Standard deviation
SII	Surface irregularity index
SIVD	Subcortical ischemic vascular disease
SLI	Symptomatic lacunar infarct
SMC	Smooth muscle cell
SNS	Sympathetic nervous system
SONIA	Stroke outcomes and neuroimaging of intracranial atherosclerosis trial
SPSS	Statistical package for the social science
STA	Superficial temporal artery
SVD	Small vessel disease
TCCD	Transcranial colour coded duplex ultrasonography
TCD	Transcranial Doppler
TGF-b	Transforming growth factor beta
TGs	Triglycerides
Ths	T helper cells
TIA	Transient ischemic attack
TLR	Toll like receptor
TNFa	Tumor necrosis factor alpha
TOF	Time of flight

TOSS 2	Trial of Cilostazol in symptomatic intracranial stenosis 2
t-PA	Tissue plasminogen activator
T reg	T regulatory cells
U/S	Ultrasonography
USA	United states
USPIO	Ultrasmall superparamagnetic iron oxide
VA	Vertebral artery
VB	Vertebro-basilar
VC	Vasoconstriction
VCAM	Vascular cell adhesion molecule
VLDL	Very low density lipoprotein
VRS	Virchow Robin spaces
vWF	Von Willebrand factor
WASID	Warfarin aspirin symptomatic intracranial disease trial
WC	Waist circumference
WI	Weighted image
WM	White matter
WMLs	White matter lesions
WHO	World health organization
WSS	Wall shear stress

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