ATHEROSCLEROTIC AORTIC ARCH PLAQUES IN ACUTE ISCHEMIC STROKE

Thesis

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LIST OF ABBREVIATIONS

AAP	:	Atherosclerotic aortic plaques
AAT	:	Aortic arch thrombosis
ACA	:	Anterior cerebral artery
ACE	:	Angiotensin-converting enzyme
AHA	:	American Heart Association
APA	:	Antiphospholipid antibodies
ATH	:	Large-vessel extracranial or intracranial atherosclerosis with stenosis
BP	:	Blood pressure
C Pneumoniae	:	Chlamydia pneumoniae
CCA	:	Common carotid arteries
CCS	:	Causative Classification of Ischemic Stroke
CE	:	Cardioembolism
CNS	:	Central nervous system
CT	:	Computed tomography
CTA	:	Computed tomography angiography
DSA	:	Digital subtraction angiography
ECA	:	External carotid artery
ECG	:	Electrocardiogram
ECM	:	Extra cellular matrix
ECs	:	Endothelial cells
ELISA	:	Enzyme-Linked Immuno-Sorbent Assay
GCA	:	Giant cell arteritis
HIV	:	Human immunodeficiency virus
HTN	:	Hypertension
HU	:	Hounsfield units
ICA	:	Internal carotid artery
IL-1	:	Interleukin-1
IMT	:	Intima-media thickness
IUC	:	Infarct of uncertain cause
LAA	:	Large-artery atherosclerosis
LAC	:	Lacunar
LACI	:	Lacunar infarcts
LDL	:	Low-density lipoprotein
LVH	:	Left ventricular hypertrophy

MCA	:	Middle cerebral artery
MCP-1	:	Monocyte chemotactic protein-1
MDCTA	:	Multidetector row computed tomography angiography
MES	:	Microembolic signal
MRA	:	Magnetic resonance angiography
MRI	:	Magnetic resonance imaging
MSCT	:	Multislice computed tomography
NIHSS	:	National Institute of Health stroke scale
NO	:	Nitric oxide
OC	:	Acute stroke of other determined etiology
OCSP	:	Oxfordshire Community Stroke Project
ORG	:	Orgaran
P1	:	Precommunicating
P2	:	Postcommunicating
PACI	:	Partial anterior circulation infarcts
PCA	:	Posterior cerebral artery
PCR	:	Polymerase chain reaction
PDGF	:	Platelet-derived growth factor
PFO	:	Patent foramen ovale
POCI	:	Posterior circulation infarcts
PSV	:	Peak systolic blood flow velocity
PTT	:	Partial thromboplastin time
ROI	:	Region of interest
SAO	:	Small-artery occlusion
SMCs	:	Smooth muscle cells
SPAF	:	The Stroke Prevention in Atrial Fibrillation
TA	:	Takayasu arteritis
TAA	:	Thoracic aortic aneurysm
TACI	:	Total anterior circulation infarcts
TCCS	:	Transcranial Color-Coded Duplex Sonography
TCD	:	Transcranial Duplex
TEE	:	Transesophageal echocardiography
TEMRI	:	Transesophageal Magnetic Resonance Imaging
TGF-α	:	Transforming growth factor alpha
TIA	:	Transient ischemic attack
TMB	:	Transient monocular blindness
TNF	:	Tumor necrosis factor
TOAST	:	Trial of ORG 10172 in Acute Stroke Treatment
TTE	:	Transthoracic echocardiography

UND	:	Stroke of undetermined etiology
VA	:	Vertebral artery
VCAM-1	:	Vascular cell adhesion molecule-1

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INTRODUCTION

Stroke is the leading cause of serious long-term disability, causing functional limitations. On average, someone has a stroke every 45 seconds and someone dies of stroke every 3 minutes. The risk of stroke increases with each decade of life **(Bates et al., 2007).**

The origin of cerebral infarction is undetermined in up to 40% of patients and an embolic origin is suspected in approximately 60% **(Castellanos et al., 2001).**

Aortic arch atheroma may be a source of thromboembolism to the cerebral circulation, or may simply be an index of the extent of arterial disease and therefore, the risk of stroke throughout the circulation. In some series, the aortic atheroma seems to be more common in patients who do not have an alternative explanation for their stroke **(Macleod et al., 2004).**

The ulcerated plaques at the aortic arch are independently associated with brain infarction of unknown cause and their association with stroke is particularly strong when the plaques are ≥4 mm in thickness **(Fujimoto et al., 2004).**

Screening of arch of aorta could be done using multislice computed tomography (MSCT) that significantly widens the scope of vascular CT imaging **(Schoepf et al., 2003).** It is seen as a potential alternative to current imaging methods for the assessment of vessel anatomy and atherosclerotic plaque composition and morphology in a great variety of arterial beds. This technique offers a wealth of new opportunities for quickly and accurately diagnosing suspected vascular diseases **(Cordeiro and Lima, 2006).**

AIM OF THE WORK

This study aims at finding out the presence, extent and shape of relevant atherosclerotic plaques in the aortic arch and their potential role as a source of embolism in patients with acute cerebral infarction of undetermined etiology using multislice computed tomography (MSCT).

CHAPTER I

ACUTE ISCHEMIC STROKE

Cerebral infarction is not a homogenous condition but can be categorized into several clinically distinct subtypes that differ in their pathogenesis and prognosis.

Categorization of subtypes of ischemic stroke has had considerable study, in the past, classifications have been based primarily on risk factor profiles, clinical features of the stroke and the findings on brain imaging using computed tomography or magnetic resonance imaging. Yet, clinical and brain imaging features overlap and are not specific for any particular subtype of ischemic stroke **(Weisberg, 1988).**

Patients are assigned to 4 major ischemic stroke categories based on National Institute of Neurological Diseases and Stroke Data Bank criteria **(Foulkes et al., 1988).**

1-Large-vessel extracranial or intracranial atherosclerosis with stenosis (ATH): Clinical features considered include prior TIA's in the same territory, stepwise increment of deficit without fluctuation, increments separated by more than three days in time, or signs of progressive brainstem ischemia. Sudden onset of stroke attributable to internal carotid occlusion is inferred thrombotic. CT changes involve infarction in the location of the "border zones" between the major cerebral arteries or cases with full anterior hemispheric infarction are consistent with atherosclerotic carotid occlusion or stenosis/thrombosis.