Cerebral vasomotor Reactivity in border-zone infarcts; A Transcranial Doppler study

Thesis

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بسم الله الرحمن الرحيم

" قالوا سبحانك لا علم لنا

إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

سورة البقرة

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Arabic Summary	

133Xe	Xenon 133
ABP	Arterial Blood Pressure
ACA	Anterior Cerebral Artery
ACoA	Anterior Communicating Artery
ACZ	Acetazolamide
AEWSI	Anterior External Watershed Infarcts
AF	Atrial Fibrillation.
BHI	Breath-holding Index
BOLD	Blood Oxygen Level-Dependent
BZ	Border Zone
CA	Cerebral Autoregulation
CBF	Cerebral Blood Flow
CBV	Cerebral Blood Volume
CO2	Carbon dioxide
CPP	Cerebral Perfusion Pressure
CR	Corona Radiata
CSO	Centrum Semiovale
CT	Computed Tomography
CVR	Cerebral Vasomotor Reactivity
DM	Diabetes Mellitus
DWI	Diffusion Weighted Image
EEG	Electroencephalographic
EWS	External Water Shed
EWSI	External Watershed Infarction.
FLAIR	Fluid Attenuated Inversion Recovery
fMRI	Functional Magnetic Resonance Imaging
FV	Flow Velocity
H+	Hydrogen.
HDI	Hemodynamic Impairment
HDL	High Density Lipoprotein.
HTN	Hypertension
ICA	Internal Carotid Artery

ICP	Intracranial Pressures
IPH	Intra Plaque Haemorrhage.
IWS	Internal Watershed
IWSI	Internal Watershed Infarction.
K+	Potassium.
LDL	Low Density Lipoprotein.
MAP	Mean Arterial blood Pressure
MCA	Middle Cerebral Artery
MES	Micro Embolic Signal
MetS	Metabolic Syndrome
MFV	Mean Flow Velocity
MI	Myocardial infarction.
MR	Magnetic Resonance
MRA	Magnetic Resonance Angiography
MRI	Magnetic Resonance Imaging
NIRS	Near-Infrared Spectroscopy
NO	Nitric Oxide.
O2	Oxygen
OEF	Oxygen Extraction Fraction
PaCO2	Carbon dioxide Partial Pressure
PaO2	Oxygen Partial Pressure
PCA	Posterior Cerebral Artery
PCoA	Posterior Communicating Artery
PET	Positron Emission Tomography
PEWSI	Posterior External Watershed Infarcts
PI	Pulsatility Index
SPECT	Single Photon Emission Computed Tomography
T1WI	T1-weighted Image
T2WI	T2-Weighted Image
TCD	Transcranial Doppler
TIA	Transient Ishaemic Attack.
V_{bh}	Velocity Breath Holding

V_r	Velocity Rest
VS	Versus
WS	Watershed
WSI	Water Shed Infarction

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Introduction

Border-zone (BZ) or Watershed (WS) infarcts involve the junction of the distal fields of two non-anastomosing arterial systems. Classic neuropathologic studies describe two distinct supratentorial WS areas, one between the cortical territories of the anterior cerebral artery (ACA), middle cerebral artery (MCA), and posterior cerebral artery (PCA), and the other in the white matter along and slightly above the lateral ventricle, between the deep and the superficial arterial systems of the MCA. The former, superficial areas have been commonly referred to as the external watershed (EWS), and the latter have been referred to as the internal watershed (IWS) **(Momjian & Baron, 2005).**

Watershed infarcts reportedly account for 10% of all brain infarcts. Although the pathological and imaging characteristics of WS infarcts are well-described, their pathogenesis remains debated whether they are caused by impaired cerebral perfusion or by embolisms from the heart, aorta, and stenotic parent artery **(Yong et al, 2006).**