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A Simple Index To Predict Myocardial Infarction Size In Patients With Acute STEMI Undergoing Primary PCI. Correlation With Myocardial Perfusion Imaging.

Thesis* Submitted *by

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Abstract

Objectives: The major determinant of final infarct size for a given coronary occlusion is the size of the myocardial area- at-risk. We propose herein a new QCA index to predict area-at-risk in patients with myocardial infarction (MI).

The aim of the study was to assess the predictive value of simple QCA index in STEMI systolic function reduction and its relation to adverse clinical outcome.Correlating it with nuclear imaging .

Study design: 52 acute MI patients with their first acute coronary syndrome incident were consecutively and prospectively enrolled in to the study. QCA index was calculated by dividing the culprit segment diameter by the sum of diameters of the left anterior descending, circumflex, and right coronary arteries at their proximal segments. We evaluated the in hospital follow-up rates of major clinical endpoints, which were defined as death, non-fatal MI, stroke, and new congestive heart failure (CHF).

Results: Simple QCA index showed no correlation with systolic function of the heart , WMSI ,Cardiac enzymes and in hospital clinical outcome . **Conclusion:** A simple index derived from coronary angiography at the time of primary percutaneous coronary intervention cannot predict

LV systolic function loss and adverse clinical outcome in patients with acute MI.

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List of Abbreviations

AAR	Area at risk.
ACC	American College of Cardiology
ACS	Acute coronary syndrome
AHA	American Heart Association
AIDS	Acquired immune deficiency syndrome.
AMI	Acute myocardial infarction
ASE	American Society of Echocardiography
AV	Atrio.ventricular.
BNP	Brain natriuretic peptide
CABG	coronary artery bypass grafting
CAD	Coronary artery disease
CBC	Complete blood count.
CHF	Congestive heart failure
CK	Creatine Kinase
COP	cardiac output
CTFC	Corrected Timi flow count .
cTnI	Troponin I
CVS	Cerebrovascular stroke
IDDM	Insulin dependant diabetis mellitus .
ECG	electrocardiograph
ESC	*European Society of Cardiology*
EF	Ejection fraction
ESV	End systolic volume
FBS	Fasting Blood Sugar
FH	Family history
FP	Flatpanel.
GP	Glycoprotein
HDL	High-density lipoprotein
HF	Heart failure
HTN	Hypertension
IHD	Ischemic heart disease
IF	Infarct size .
IVUS	Intravascular ultrasonography .
LA	Left atrium
LAD	Left Anterior descending
LBBB	left bundle branch block

LCX	Left circumflex artery.
LDL	Low density lipoprotein
LV	Left Ventricle
LVEF	left ventricular ejection fraction
MACE	Major Adverse Cardiovascular end points.
MAR	Myocardial at risk.
MBG	Myocardial blush grade.
MLD	Minimal lumen diameter.
MR	Mitral regurge.
MRI	magnetic resonance imaging
MVD	Multivessel Disease.
PCI	Primary percutaneous intervention
PPCI	primary percutaneous coronary intervention
PT	Prothrombin Time
PTCA	Percutaneous transluminal coronary angioplasty
P value	Probability value
PMVs	Premature ventricular beats.
QCA	Quantitative Coronary Analysis
RBS	Random Blood Sugar.
RCA	Right Coronary Artery
RII	Relative Importance Index .
RV	Right ventricle
RVD	Refrence vessel diameter.
RVF	Right ventricular failure.
SD	Standard deviation.
SPECT	single-photon emission computed tomography
SPSS	Statistical Package for the Social Science
STEMI	ST segment elevation myocardial infarction
Tc 99	Technicium 99 .
TDI	tissue Doppler imaging
TIMI	Thrombosis In Myocardial Infarction
TMPG	TIMI Myocardial Perfusion Grade
UA	Unstable angina
WMSI	Wall motion score index.
VF	Venricular fibrillation .

VT	Venricular tachycardia .
VSD	Ventricular septal defect.

Introduction

ST segment elevation myocardial infarction (STEMI) constitutes 40% of all acute myocardial infarctions (AMI), which continues to be a significant public health problem in both developed and developing counties (1).

Primary percutaneous intervention (PCI) is now classified as class I indication in STEMI in the Guidelines of the European Society of Cardiology (ESC) (2).

Reperfusion therapy is the cornerstone of the treatment of patients with acute ST elevation myocardial infarction (STEMI) (3). Many randomized clinical trials have shown that primary percutaneous coronary intervention (PCI) is superior to thrombolytic therapy in the treatment of patients with STEMI (4).

The aim of reperfusion therapy for many years has focused on achieving epicardial artery patency at the site of the occlusive thrombus. It is now possible, through advances in interventional techniques and adjunctive pharmacological treatment, to achieve TIMI (Thrombosis In Myocardial

Infarction) grade 3 epicardial flow (normal) in 95% of patients(5,6).

Despite this achievement, mortality, although declining, still remains high . This is possibly because despite restoration of TIMI grade 3 flow, 40% of patients do not achieve microvascular flow, which should be the goal of reperfusion therapy (7).

Successful primary PCI within 3–24 hours of the onset of chest pain has been associated with improved LV systolic function at a mean follow-up period of 22 months (8).. Other studies of primary PCI have also reported improved LV systolic function compared to thrombolysis (9).

Early improvement of perfusion after MI will improve left ventricle function and decrease the infarction area, thus decreasing mortality(10,11). The efficacy of reperfusion treatment may be shown indirectly with electrocardiography (ECG), by regression of ST elevation, but there is a need for methods to demonstrate left ventricle and microvascular function improvement(12) .

Over the last 20 years, nuclear cardiology has become a mainstay in the evaluation of ischemic heart disease. In the setting of acute coronary syndromes (myocardial infarction or unstable angina), myocardial perfusion imaging has emerged as an important tool in assessing the functional significance of angiographic coronary stenoses, evaluating the efficacy of therapeutic intervention. and risk-stratifying patients in the post infarction period (13).

Myocardial perfusion imaging possesses not only diagnostic but also prognostic value, because it permits stratification of patients into categories of risk for future cardiac events.

The major determinant of final infarct size for a given coronary occlusion is the size of myocardium that the artery perfuses. Defining the initial area-at-risk (AAR) for infarction has major clinical implications since it permits an accurate estimate of myocardial salvage provided by reperfusion therapies. We proposed a new index 'Relative Importance Index (RII)' to predict potential infarct size in patients with acute MI.