Correlation between Risk Score Systems and Coronary Artery Disease Detected by Multislice Computed Tomography

Thesis

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Presented by

Sarah Sherif El Sayed Siliman Azab

(M.B.B.Ch.)

Under Supervision of

Prof. Dr. Adel Gamal Hasanin

Professor of Cardiology

Faculty of Medicine- Ain Shams University

Dr. Ahmed Mohamed El Mahmoudy

Assistant Professor of Cardiology

Faculty of Medicine- Ain Shams University

Dr. Mohamed Mostafa Farouk

Lecturer of Cardiology

Faculty of Medicine - Ain Shams University

Faculty of Medicine

Ain Shams University

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Sarah Azab

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List of Abbreviations

Abb.	Full term
ACS	**:** Acute coronary syndrome
APV	**:** Aggregate plaque volume
ASCVD	**:** Atherosclerotic cardiovascular disease
AEC	**:** Automatic exposure control
BMI	**:** Body mass index
CAC	**:** Coronary artery calcium
CACS	**:** Coronary artery calcium score
CAD	**:** Coronary Artery disease.
CCTA	**:** Coronary computed tomography angiography
CFD	**:** Computational fluid dynamics
CHD	**:** Coronary heart disease
CS	**:** Calcium scoring
CTA	**:** Computed tomography angiography
CVD	**:** Cardiovascular disease
CV	**:** Cardiovascular
DSCT	**:** Dual-source CT
EBCT	**:** Electron-beam CT
FFR	**:** Fractional flow reserve
FRS	**:** Framingham risk score
HU	**:** Hounsfield unit
ICA	**:** Invasive Coronary Angiography
IR	**:** Iterative reconstruction
IVUS	**:** Intravascular ultrasound

List of Abbreviations (Cont..)

Abb.	Full term
kVp	**:** Kilovolt Peak
LAD	**:** Left anterior descending artery
LCX	**:** Left circumflex artery
LM	**:** Left main
mAs	**:** Milli Ampere Second
MLA	**:** Minimal lumen area
MLD	**:** Minimal lumen diameter
MPR	**:** Multiplanar reformatting
MRI	**:** Magnetic resonance imaging
ms	**:** Millisecond
MSCT	**:** Multislice computerized tomography
mSv	**:** Millisievert
NCEP	**:** National Cholestrol Educational Program
PAV	**:** Percent atheroma volume
PET	**:** Positron emission tomography
PL	**:** Posterolateral artery
PPV	**:** Positive predictive values
PROCAM	**:** Prospective Cardiovascular Munster study
RCA	**:** Right coronary artery
SCORE	**:** Systematic Coronary Risk Evaluation
SPECT	**:** Single photon emission computed tomography
VH	**:** Virtual histology
WHO	**:** World Health Organization

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Introduction

Coronary artery disease (CAD) is the leading cause of morbidity and mortality in most industrialized nations throughout the world, responsible for enormous loss of human life involving huge expenditure globally. In 2010, nearly 15.6 million out of 52.7 million deaths worldwide, were due to cardiovascular disease **(Lozano et al., 2010).**

More than 90% of myocardial infarctions are attributed to modifiable risk factors such as hypertension, smoking, dyslipidemia, diabetes, abdominal obesity, exposure to traffic air pollution and noise, psychological factors, and insomnia **(Rapsomanik, 2014).**

Global CVD risk assessment is an integrated approach to prevention that recognizes the hazards of multiple risk factors to determine the absolute risk of experiencing a CVD event in a given time period. Almost all CVD guidelines recommend some form of risk scoring as a way to prioritize and plan primary prevention interventions **(Pearson et al., 2002).**

Cardiovascular risk scoring systems give an estimate of the probability that a person will develop cardiovascular disease within a specified amount of time, usually 10 to 30 years. Because they give an indication of the risk of developing cardiovascular disease, they also indicate who

is most likely to benefit from prevention **(D'Agostino et al., 2008).**

It is generally believed that invasive coronary angiography (ICA) is the be the gold standard in evaluating CAD, but with the development of the 16-multi-detector CT (MDCT), a non-invasive approach of coronary CT angiography (CTA) has been applied widely to avoid the complications of (ICA) **(Mowatt et al., 2008).**

It is generally believed that lipid-rich plaques have a higher risk of rupture with consequent thrombosis than fibrotic plaques, thus, differentiation of different plaques based on measurements of CT attenuation has attracted attention to researchers. Studies comparing MSCT angiography with intravascular ultrasound (IVUS) demonstrated that MSCT angiography is able to detect variable densities in the coronary atherosclerotic plaques **(Korosoglou et al., 2010), (Motoyama et al., 2009).**

Progressive increasing worldwide use of CCTA has demonstrated that CCTA has the potential to revolutionize how patients are risk-stratified by identifying rupture-prone, non-calcified or predominant non-calcified coronary plaques accurately and reliably **(Kitagawa et al., 2009), (Butler et al., 2007).**

Aim of the Work

To study the correlation between Risk Score Systems and the extent of Coronary Artery Disease detected by Coronary CT angiography.