ROLE OF CORONARY COMPUTED TOMOGRAPHY ANGIOGRAPHY IN EMERGENCY DEPARTMENT

Essay Submitted for partial fulfillment of
Master degree of Radiodiagnosis

By

Karim Essam Mohammed

M.B., B.Ch.

Supervised By

Prof. Dr. Yasser Ali Mohamed Abdel Mawla

Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Asst. Prof. Dr. Ayman Mohamed Ibrahim

Assistant Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University

2014

بسم الله الرحمن الرحيم

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

Acknowledgement

First and foremost, I feel always indebted to **Allah,** *the most kind and the most merciful.*

I would also like to express my great thanks and gratitude to **Prof. Dr. Yasser Ali Mohamed Abdel Mawla** *Professor of Radio-diagnosis, Faculty of Medicine, Ain Shams University, for his generous help and continuous encouragement. he provided me with invaluable comments, knowledge, experience and hand necessary for achieving this work.*

I would like to express my deepest thanks and gratitude to **Asst. Prof. Dr. Ayman Mohamed Ibrahim** *Assistant Professor of Radiodiagnosis of Radio-diagnosis, Faculty of Medicine, Ain Shams University, for his kind support, guidance and valuable remarks.*

I would also like to thank my beloved parents, my lovely wife and my little children for their tenderness, love and care.

Karim Essam Mohammed

Contents

Subjects ***Pages***

List of Abbreviations

AHA	American Heart Association
ACS	Acute Coronary Syndrome
Ao	Aorta
Ap	Atrial Appendage
AV node :	Atrioventricular node
Bpm	Beats per minute
CAD	Coronary artery disease
CAG	Conventional coronary angiography
CHD	Coronary heart disease
cm	Centimeter
CMR	Cardiac magnitic resonance
CS	Coronary Sinus
CT	Computed Tomography
CTA	Computed Tomography Angiography
CX	Circumflex
Diag	Diagonal Branches
DECT	Dual energy Computed Tomography
DSCT	Dual source Computed Tomography
ECG	Electrocardiography
HU	Hounsfield
IHD	Ischemic Heart Disease
ICA	Invasive coronary angiography

Int	Intermediate coronary artery
IV	intravenous
IVC	Inferior Vena Cava
IVUS	Intravascular ultrasound
Kv	Kilovolt
LA	Left Atrium
LAD	Left Anterior Descending
L.Conal	Left Conal Branch
LCA	Left Coronary Artery
LCx	Left Circumflex
LM	Left Main
LV	Left Ventricle
mA	Milliampere
MAc	Marginal Acute
MDCT	Multi Detector Computed Tomography
mg	Milligram
mg/ dl	Milligram per decilitre
MIP	Maximum Intensity Projection
mm	Millimeter
mmHg	Millimeter Mercury
MO	Marginal Obtuse
MPR	Multi planar reformat/reconstruction.
MSCT	Multi slice computed tomography
Msec	Millisecond
mSv	Milliseivert.

OM	Obtuse marginal
O2	Oxygen
PA	Pulmonary Artery
PDA	Posterior descending artery
PL	Postero-lateral branch of RCA
RA	Right Atrium
RAp	Right Atrial Appendage
RCA	Right Coronary Artery
RV	Right Ventricle
SNB	Sinus Node Branch
SSCT	Single source computed tomography
SPECT	Single Photon Emission Computed Tomography
SVC	Superior vena cava
VRT	Volume-Rendering Technique
VS	versus
Window W/L	Window width/level
1D	First Diagonal Branches
2D	Second Diagonal Branches
2D- image	two diminished
3D-image	three diminished
1-S	First Septal

List of figures

List of Tables

Intoduction And Aim of the Work

Introduction

Acute coronary syndrome (ACS), a common complication of coronary heart disease, is associated with more than 2.5 million hospitalizations worldwide each year. Most cases of ACS are caused by rupture of an atherosclerotic plaque in a coronary artery, resulting in the formation of a thrombus, which can restrict the flow of blood to the heart muscle. The degree of arterial blockage caused by the thrombus determines the amount of myocardial damage that occurs and the type of ACS that results**. (Overbaugh, 2009).**

Computed tomography angiography (CTA) of the heart is a rapidly evolving application for comprehensive assessment of coronary arterial anatomy, myocardial function, perfusion, and myocardial viability. Thus, cardiac CTA is capable of retrieving the most critical information for guiding the management of patients with suspected coronary heart disease (CHD). **(Sharma and Arbab-Zadeh, 2012).**

Ongoing technologic advancements have allowed acquiring such information within minutes, at radiation doses that are lower than those from conventional computed tomography imaging or common nuclear imaging techniques. Cardiac CTA has positioned itself as an imaging modality that may be well suited to fulfill central needs of cardiovascular medicine**. (Sharma and Arbab-Zadeh, 2012).**

In clinical practice, assessment of chest pain patients presenting to the emergency department is difficult and the work-up can be lengthy and costly. There is growing evidence supporting the use of coronary computed tomography angiography (CTA) in early assessment of patients presenting with acute chest pain to the emergency department.
CTA appears to be a faster and more accurate way to diagnosis or rule out coronary stenosis, leading to reduced hospital admissions, decreased time in the ED and lower costs**. (Cury et al., 2011).**

Use of coronary CT angiography (CTA) in the early evaluation of low-intermediate risk chest pain in the emergency department represents a common, appropriate application of CTA in the community. Three large randomized trials have compared a coronary CTA strategy with current standard of care evaluations in >3000 patients.These trials consistently show the safety of a negative coronary CT angiogram to identify patients for discharge from the emergency department with low rates of major adverse cardiovascular events, at significantly lower cost, and greater efficiency in terms of time to discharge. Together, these trials provide definitive evidence for the use of coronary CTA in the emergency department in patients with a low-to-intermediate pretest probability of coronary artery disease. Clinical practice guidelines that recommend the use of coronary CTA in the emergency department are warranted. **(Cury et al., 2013).**