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THE ROLE OF MULTI-DETECTOR COMPUTED TOMOGRAPHY IN POSTOPERATIVE ASSESSMENT OF CORONARY ARTERY BYPASS GRAFT (C.A.B.G.) CASES AND EVALUATION OF CORONARY STENTS

Essay
Submitted for partial fulfillment of Master degree in Radio-diagnosis

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2010

Acknowledgment

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. Khalid Essmat Allam*** *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 Dr. ***Rania Ali Maarouf*** *A.Professor of Radio-diagnosis, Faculty of Medicine, Ain Shams University, for her kind support, guidance and valuable remarks.*

I would also like to thank my beloved family for their tenderness, love and care.

Khaled Alsayed Aref

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LIST OF ABBREVIATIONS

ACS	Acute Coronary Syndrome
AMI	Acute Myocardial Infarction
CABG	Coronary Artery Bypass Graft
CAD	Coronary Artery Disease
CHF	Congestive Heart Failure
DES	Drug-Eluting Stents
LAD	Left Anterior Descending Artery
LCA	Left Coronary Artery
LCx	Left Circumflex artery
LIMA	Left Internal Mammary Artery

MDCT	Multi-Detector Computed Tomography
MPR	Multiplanar Reconstruction
MIP	Maximal Intensity Projection
PTCA	Percutaneous Transluminal Coronary Angioplasty
PDA	Posterior Descending Artery
RCA	Right Coronary Artery
RI	Ramus Intermedius artery
RIMA	Right Internal Mammary Artery
SFOV	Scan Field Of View
SVG	Saphenous Vein Graft
VR	Volume Rendering

INTRODUCTION

- Coronary artery disease (CAD) is the leading cause of death in the western countries. Its prevalence in developing countries is increasing due to change in life styles and the increase in population at risk worldwide. Hypertension and arterial atherosclerosis are among the leading predisposing factors for (CAD). Other risk factors include diabetes mellitus, hyper-lipidaemia, smoking & family history of (CAD) **(Schuijf J et al, 2005)**

- CT is a viable noninvasive modality for delineating coronary arterial anomalies **(Jaydip D et al, 2005)**

- Coronary artery bypass graft (CABG) surgery remains the standard of care in the treatment of advanced coronary artery disease. It is well recognized that the long-term clinical outcome after myocardial revascularization is dependent on the patency of the bypass grafts. Conventionally, invasive coronary angiography has been used to assess graft status and evaluate for graft occlusion. The value of computed tomography (CT) in the assessment of bypass grafts continues to grow with advances in CT technology. Multi-detector CT scanners combine high spatial resolution with the ability to demonstrate anatomy through volume-rendered images, thus producing a more sensitive evaluation over conventional or spiral CT. The addition of electro-cardio-graphic gating minimizes cardiac and coronary graft motion, further improving the sensitivity and specificity of multi-detector CT evaluation for graft patency **(Nieman K et al ,2003;Ropers D et al, 200;Engelmann MG et al, 2000;Ha JW et al,1999;Achenbach S et al, 1997)**

- These advances have also increased the ability to estimate the extent of intraluminal graft occlusion with noninvasive imaging techniques. The assessment of graft patency in a non-invasive readily applicable manner would have major benefits for the management and treatment of patients with prior CABG. The large caliber and more static location of bypass grafts make them particularly suitable for investigation by potential non-invasive imaging modalities **(Brundage BH et al, 2004; Gunthaner DF et al, 2006)**.

- Computed tomography angiography was first described as a means of determining bypass graft patency in early 1980s. With advances in spiral and multi-detector computed tomography (MDCT) technology, there has emerged a growing body of evidence to support the use of computed tomography for non-invasive bypass graft assessment.

- The introduction of multi-detector computed tomography (MDCT) has permitted the non-invasive visualization of coronary arteries with sufficient temporal and spatial resolution. Moreover, MDCT has been used to research the assessment of coronary artery stent patency and discrimination between the presence of in-stent stenosis. Re-stenosis occurs in a substantial amount of patients which have been treated with stent implantation (**Gaspar T et al, 2005**)

- With the emergence of 40 and 64-slice MDCT systems the assessment of lumen visibility and diagnostic accuracy of in-stent restenosis has been improved considerably with respect to the 16-slice MDCT systems (**Maintz D et al, 2005**)