Value of Pre-procedural Multi-detector Computed Tomography Angiography in Prediction of Outcome in Retrograde Approach Recanalization For Coronary Chronic Total Occlusion

Thesis

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List of Abbreviations

Abb.	Full term
ACC	*American collage of cardiology*
ACCF	*American collage of cardiology foundation*
ACR	*American collage of radiology*
ACT	*Activated clotting time*
AF	*Atrial fibrillation*
AHA	*American heart assocatation*
AIV	*Anterior interventricular veiv*
ASNC	*American society of nuclear cardiology*
AUC	*Appropiaitness use criteria*
BMS	*Bare metal stent*
CAC	*Coronary artery calcium*
CABG	*Coronary artery bypass graft*
CAD	*Coronary artery disease*
CART	*Controlled antegrade and retrograde subintimal tracking*
CC	*Coronary collaterals*
CHD	*Congenital heart disease*
CMPR	*Curved multiplanar reconstruction*
CRT	*Cardiac resynchorization theraby*
CS	*Coronary sinus*
CSA	*Cross sectional area*
CT	*Computed tomography*
CTA	*Computed tomography angiography*
CTDI	*CT dose index*
CTOs	*Chronic total occlusions*
DES	*Drug Eluting Stent*
DLP	*Dose length product*
FOV	*Field of view*
GCV	*Great cardiac vein*
GW	*Guide wire*
HF	*Heart failure*
hs CRP	*High sensitivity c-reactive protein*
HU	*Hounsfield unit*

List of Abbreviations cont…

Abb.	Full term
ICA	*Invasve coronary angiography*
ISR	*Instent re-stenosis*
IVUS	*Intravascular ultrasound*
J-CTO score	*Japanese chronic total occlusion*
LAA	*Left atrial appendage*
LAD	*Left anterior descending artery*
LCX	*Left circumflex artery*
LIPV	*Left inferior pulmonary vein*
LMCA	*Left main coronary artery*
LMT	*Left main trunk*
LMV	*Left marginal vein*
LV	*Left ventricle*
LVEF	*Left ventricular ejection fraction*
MACE	*Major adverse cardisvascular events*
MDCT	*Multidetector Computed Tomography*
mGY	*Milli Gray*
MIP	*Maximum intensity projection*
MPR	*Multiplanar reconstruction*
MRCP	*Maximum recommended contrast dose*
MRI	*Magnetic resonance imaging*
mSv	*Milli Sieverts*
NPV	*Negative predictive value*
OM	*Obtuse marginal branch*
OTW	*Over the wire*
PCI	*Percutaneus coronary intervention*
PE	*Pulmonary embolism*
PET	*Peisetron emission tomography*
PIV	*Posterior interventricular vein*
PVI	*Pulmonary vein isolation*
RCA	*Right coronary artery*
RSPV	*Right superior pulmonary vein*
SAQ	*Seattle angina questionnaire*
SCCT	*Society of cardiovascular computed tomography*

List of Abbreviations cont…

Abb.	Full term
SPECT	*Single photon emission computed tomography*
STAR	*Subintimal tracking and re-entry technique*
TAVI	*Transcatheter Aortic valve implantation*
TEE	*Transoesophageal echocardiography*
TIMI	*Thrombolysis in myocardial infarction*
TTE	*Trans thoracic echocardiography*
U.S	*United states*
VRT	*Volume rendering technique*

INTRODUCTION

Chronic total occlusion (CTO) recanalization still represents the final frontier in percutaneous coronary intervention (PCI)

Jeroudi et al. (2013) reviewed 1699 consecutive patients who underwent coronary angiography at a Veterans Affairs hospital and reported that the prevalence of CTO among coronary artery disease (CAD) patients with and without prior coronary artery bypass graft (CABG) surgery was 89% and 31%, respectively[1] higher than reported in a recent large Canadian registry (54% and 18.4%, respectively),[2] but similar to other prior studies [3,4].

Successful recanalization of CTO lesions in patients with viable myocardium not only facilitates the reduction of angina symptoms, avoid bypass surgery and decrease incidence of myocardial infarction, but also may improve long –term survival [5,6]. An analysis of 25 years of experience in the Mayo Clinic showed that the procedural success rate for CTO remained around 70%[7].

Multi–detector computed tomography (MDCT) can visualize the coronary artery lumen, artery wall, and atherosclerotic plaque; even the lipid pool can be visualized, which is fibrous, calcified, and heavily laden with cholesterol [8,9].

CT coronary angiography is a useful tool to optimize PCI strategy as it is possible to characterize the length, course, and

composition of an occluded artery and allow visualization of the distal runoff and side branches[10].

Retrograde approach has been described initially via the bypass grafts [11], and more recently the use of septal collaterals has been described to be safe and effective[12]. Retrograde approach for recanalization of CTO has gained popularity recently with improved success rates as shown in several case reports and small series of selected patients[13].

AIM OF THE WORK

The goal of this study is to evaluate the imaging results from Multi-detector Computed Tomography angiography (MDCT) in chronic coronary total occlusion(CTO) before retro grade Approach In percutaneaous coronary intervention(PCI).

Chapter One

MULTISLICE CT

Historical overview

X-ray computed tomography (CT) has proven to be a major advance in the field of medicine.

Single detector CT scanners were first utilized in the **early 1970's.**

The images produced were acquired in the axial plane as individual slices 8-13 mm in thickness.

The scanner gantry (x-ray tube) had a single detector which translated around the patient as the patient table moved in the cephalocaudal (z-axis) direction fig (1).

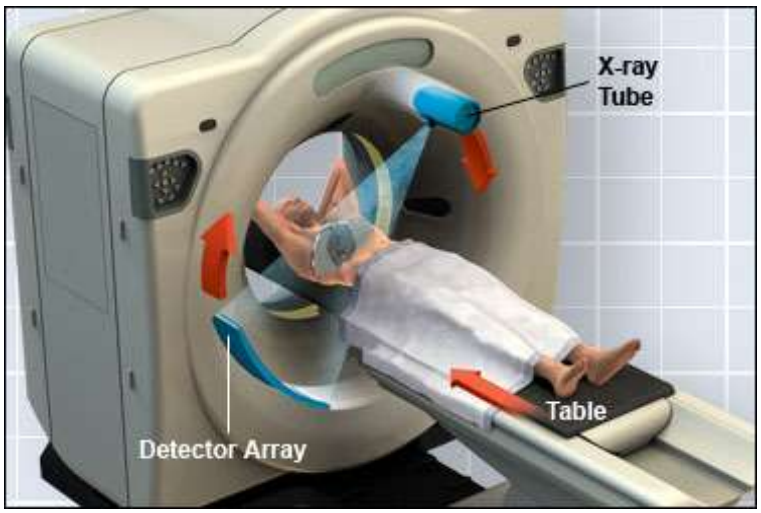

Fig. (1): CT machine.

As early as 1975 there are descriptions of reconstruction techniques using axial CT data to construct coronal and sagittal image planes [14].

In 1979, garnering the Nobel Prize in medicine for Sir Godfrey Newbold Hounsfield and Allan McLeod Cormack.

Since then, numerous advances have been made with the introduction of high quality scanners and new imaging protocols to enhance the quality of the images and reduce the amount of radiation.

Second and third generation CT scanners were improved by increasing the number of detectors and by converting the translation motion of the radiation source to rotation, respectively, resulting in Rapidly increases in imaging speed with improved image quality.

Standard two dimensional (2D) images now are beyond axial, sagittal and coronal planes to include off axis and curved planar images.

Three dimensional (3D) volume rendered images are now commonly displayed in motion, adding a fourth dimension (4D) [15].

Multidetector computed tomography (MDCT):

In the 1980s 4 channel MDCT appeared in commercial use.

Since that era, the addition of more imaging channels, rows or detectors has increased exponentially.