The Value of Left Atrial Deformation Analysis as a Predictor of Severity of Coronary Artery Disease

Thesis

Submitted in Partial Fulfillment for Master Degree in Cardiology

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بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

﴿وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا﴾

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List of Abbreviations

Abb.	Full term
2D	*Two-dimensional*
ACC	*American College of Cardiology*
ACEF	*The Value of Age, Creatinine, and Ejection Fraction*
ACS	*Acute coronary syndrome*
AF	*Atrial fibrillation*
AHA	*American Heart Association*
AP	*Anteroposterior view*
BCIS-1	*The balloon pump-assisted coronary intervention study*
CABG	*Coronary artery bypass grafting*
CAD	*Coronary artery disease*
CHF	*Chronic heart failure*
CIN	*Contrast induced nephropathy*
CRP	*C-reactive protein*
DES	*Drug-eluting stent.*
EDS	*Early diastolic strain*
EDS	*Early diastolic strain*
EF	*Ejection fraction*
ESC	*European Society of Cardiology*
EuroSCORE	*European system for cardiac operative risk evaluation*
FPG	*Fasting blood glucose*
GFR	*Glomerular filtration rate*
GRC	*The Global Risk Classification*
HF	*Heart failure*
hs-TnT	*High sensitivity troponins*
HTN	*Hypertension*

List of Abbreviations Cont...

Abb.	Full term
IHD	*Ischaemic heart disease*
LA	*Left atrium*
LAa SR	*Peak atrial longitudinal strain rate during ventricular late diastole*
LAD	*Left anterior descending*
LAe SR	*Peak atrial longitudinal strain rate during ventricular early diastole*
LAO	*Left anterior oblique*
LAs SR	*Peak atrial longitudinal strain rate during ventricular systole*
LAVmax	*LA maximum volume*
LAVmin	*LA minimum volume*
LAVpreA	*Pre A volume*
LCX	*Left circumflex*
LDS	*Late diastolic strain*
LM	*Left main coronary artery*
LV	*Left ventricle*
LVDd	*Left ventricular end-diastolic dimension*
LVDs	*Left ventricular end-systolic dimension*
LVEF	*Left ventricular ejection fraction*
LVH	*Left ventricular hypertrophy*
MACE	*Major adverse cardiac events*
MI	*Myocardial infarction*
MR	*Magnetic resonance*
NCDR	*National Cardiovascular Data Registry*
NSTE-ACS	*Non ST elevation acute coronary syndrome*
NYHA	*New York Heart Association;*
OM	*Obtuse marginal branch*
PACS	*Peak Atrial Contraction strain*

List of Abbreviations Cont...

Abb.	Full term
PALS	*Peak atrial longitudinal strain*
PCI	*Percutaneous coronary intervention*
PDA	*Posterior descending artery*
RAO	*Right anterior oblique*
RCA	*Right coronary artery*
ROI	*Region of interest*
RV	*Right ventricle*
SR	*Strain rate*
SS	*Systolic strain*
SS	*Systolic strain*
STE	*Speckle Tracking Echocardiography*
STEMI	*ST-elevation myocardial infarction.*
TDI	*Tissue Doppler imaging*

INTRODUCTION

Coronary artery disease (CAD) is the leading cause of death all over the world. The World Health Organization estimates that approximately 17 million people die from CAD every year.[1]

LV diastolic function is abnormal in a high percentage of patients with CAD at rest independent of LV systolic function and may occur even in the absence of regional or global left ventricular systolic dysfunction.[2-3] It has been suggested that left ventricular diastolic dysfunction may occur before left ventricular systolic dysfunction and therefore serve as an early and sensitive marker of ischemia.[4]

The principal role of the left atrium is to modulate left ventricular (LV) filling and cardiovascular performance by functioning as a **reservoir** for pulmonary venous return during ventricular systole, **a conduit** for pulmonary venous return during early ventricular diastole, and **a booster pump** that augments ventricular filling during late ventricular diastole.[5]

Two-dimensional (2D) speckle-tracking strain imaging is a novel method for quantitative real-time assessment of regional myocardial deformation that uses tracking of acoustic speckles or kernels rather than Doppler myocardial velocities (6). It has been suggested that Left atrium strain as measured by 2D speckle tracking can be used to evaluate dynamic LA function.[7]

Coronary angiography is the gold standard for diagnosis of coronary artery disease.[8] The Synergy between PCI with TAXUS and Cardiac Surgery score (SYNTAX score) is anatomically based risk calculation that characterize the severity of CAD.[9-11]

Aim of the Work

The aim of this study is to evaluate the relation between LA strain and the severity of coronary artery stenosis in patients with CAD.