

Abstract

Introduction: The wide spectrum of coronary artery diseases (CAD) ranging from stable ischemic heart disease (SIHD) to acute coronary syndrome (ACS) is considered a major cause of death and disability worldwide.

Aim of the Work: The aim of this study is to assess the impact of coronary artery bypass grafting on left ventricular functions and mechanical dyssynchrony using color coded tissue Doppler imaging.

Patients and Methods: This study was conducted on 58 consecutive patients with ischemic heart disease who were electively referred to perform CABG, in the period between March 2015 to March 2016 at Ain Shams University Hospitals and at Nasr City Insurance Hospital.

Results: Initially 58 patients were screened however the study was performed on 44 patients with ischemic heart disease in the period between March 2015 and March 2016 who were referred to Ain-Shams University Hospitals and to Nasr City Health Insurance Hospital for elective CABG surgery.

Conclusions: Surgical revascularization significantly reduced Ts-SD. The 3 indices of dyssynchrony namely Ts-SD, Ts difference and BSPLWMD were correlated to each other however none of them correlated to EF. Hypertensive patients showed significantly higher levels of dyssynchrony compared to non-hypertensive patients both at baseline and at follow up and showed greater benefit from surgery compared to non-hypertensive group.

Recommendations: Larger study population and multi-center study are recommended with more homogenous selection of study population. Long term follow up to correlate symptoms with echocardiographic dyssynchrony indices is recommended.

Keywords: Coronary Artery Bypass Grafting, Left Ventricular, Mechanical Dyssynchrony, Tissue Doppler imaging

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List of Abbreviations

Abbrev.	Meaning
2D	: Two Dimension
Aa	: Myocardial velocity associated with atrial contraction
ABP	: Arterial Blood Pressure
ACS	: Acute Coronary Syndrome
AMI	: Acute Myocardial Infarction
AP ₂ CH	: Apical Two Chamber View
AP ₄ CH	: Apical Four Chamber View
AV	: Atrio-Ventricular
AVC	: Aortic Valve Closure
AVO	: Aortic Valve Opening
CABG	: Coronary Artery Bypass Grafting
CAD	: Coronary Artery Disease
CBF	: Coronary Blood Flow
CCS	: Canadian Cardiovascular Score
CMR	: Cardiac magnetic resonance
CRT	: Cardiac Resynchronization Therapy
CT	: Computed Tomography
CW	: Continuous Wave
DSE	: Dobutamine Stress Echocardiography
Ea	: Early diastolic myocardial relaxation velocity
ECG	: Electrocardiogram
EF	: Ejection Fraction
ESV	: End Systolic Volumes
ET	: Ejection Time
HbA _{1c}	: Glycated Hemoglobin
HCM	: Hypertrophic Cardiomyopathy
HCVAb	: Hepatitis C Virus Antibody
HFPEF	: Heart Failure with Preserved Ejection Fraction

IHD	: Ischemic Heart Disease
IVCT	: Iso-Volumic Contraction Time
IVMD	: Inter-Ventricular Mechanical Delay
IVRT	: Iso-Volumic Relaxaion Time
LA	: Left Atrium
LAD	: Left Anterior Descending Artery
LBBB	: Left Bundle Branch Block
LM	: Left Main
LV	: Left Ventricle
LVEDV	: Left Ventricular End Diastolic Volume
LVEF	: Left Ventricular Ejection Fraction
LVESV	: Left Ventricular End Systolic Volume
LVH	: Left Ventricular Hypertrophy
LVPEP	: Left Ventricular Pre Ejection Period
LWPSD	: Lateral Wall Post Systolic Displacement
MI	: Myocardial Infarction
mmHg	: Millimeter Mercury
MPI	: Myocardial Performance Index
MR	: Mitral Regurgitation
Msec.	: Millisecond
MVD	: Multi-Vessel Disease
NSTEACS	: Non ST Elevation Acute Coronary Syndrome
NSTEMI	: Non ST Elevation Myocardial Infarction
PCI	: Percutaneous Coronary Intervention
PSAX	: Parasternal Short Axis
PSS	: Post Systolic Shortening
PTCA	: Percutaneous Transluminal Coronary Angioplasty
PW	: Pulsed Wave
PW-TDI	: Pulsed Wave Tissue Doppler Imaging
RCT	: Randomized Controlled Trials
RT3DE	: Real Time 3 Dimensional Echocardiography

RV	: Right Ventricle
RVPEP	: Right Ventricular Pre Ejection Period
Sa	: Systolic myocardial velocity
SDI	: Systolic Dyssynchrony Index
SIHD	: Stable Ischemic Heart Disease
SPWMD	: Septal to Posterior Wall Motion Delay
SR	: Sarcoplasmic Reticulum
SRI	: Strain Rate Imaging
STEMI	: ST Elevation Myocardial Infarction
TDI	: Tissue Doppler Imaging
TSI	: Tissue Synchronization Index
Ts-SD	: Standard Deviation of Time to Peak Systolic Velocity
WMSI	: Wall Motion Score Index

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Introduction





Aim of the Work





Review of Literature





CHAPTER (1)

Burden of Ischemic Heart Disease

