Evaluation of Myocardial Contraction Fraction as an Echocardiographic Predictor of Functional Capacity in Patients with Heart Failure with Reduced Ejection Fraction

Thesis

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Hassan Ahmed Addow

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List of Abbreviations

Abb.	Full term
2D	Two dimensional
3D	Three dimensional
3D-STE	Three-dimensional speckle-tracking echocardiography
3DTOE	Three Dimensional Trans esophageal Echocardiography
6MWD	6-minute walk test duration
6MWT	Six minute walk test
ACC/AHA	American College of cardiology
ACE	Angiotensin converting enzyme
AF	Atrial fibrillation
AIDS	Acquired immunodeficiency syndrome
ARVC	Arrythmogenic right ventricular cardiomyopathy
ASE	American Society of Echocardiography
BMI	Body Mass index
BSA	Body surface area
CAD	Coronary artery disease
CNS	Central nervous system
CO	Cardiac out put
COPD	Chronic obstructive pulmonary disease
CPET	Cardiopulmonary exercise testing
CRT	Cardiac resynchronization therapy
DBP	Diastolic blood pressure
DC	Direct Cardio version
DCM	Dilated cardiomyopathy
DM	Diabetes mellitus
E	Early diastolic velocity wave

List of Abbreviations (Cont...)

Abb.	Full term
E/A	Ratio between early diastolic wave amplitude of annlus movement and late diastolic wave amplitude of annulus movement
ECG	Electrocardiogram
EDV	End Diastolic volume
EF	Ejection fraction
ESV	End Systolic volume
HCM	Hypertrophic cardiomyopathy
HF	Heart failure
HFpEF	Heart failure preserved ejection fraction
HFrEF	Heart failure reduced ejection fraction
HIV	Human immunodeficiency virus
HmrEF	Heart failure mid-range ejection fraction
HR	Heart rate
HRQOL	Health related Quality of life
HTN	Hypertension
ICD	Intracardiac defibrillator
IHD	Ischemic heart disease
IVS	Intervenrticular septum
LA	Left atrium
LAA	Left atrial appendage
LDL	Low density lipoprotein
LV	Left ventricle
LVH	Left ventricular hypertrophy
LVM	Left ventricular mass
MA	Mitral annulus
MCF	Myocardial contraction fraction
METS	Metabolic equivalents
Min	Minute

List of Abbreviations (Cont...)

Abb.	Full term
Ml/kg/min	Milliliters per kilogram per minute
MLHFQ	Minnesota Living with Heart failure Questionnaire
mm	Millimeter
mmHg	Millimeter mercury
MR	Mitral regurgitation
NYHA	New York Heart Association Functional
PR	Pulmonary regurgitation
PW	Posterior wall
RA	Right atrium
RAAS	Renin angiotensin converting enzyme Aldosterone system
RT3DE	Real time three dimension echocardiography
RT4DE	Real time four dimension echocardiography
RVSP	Right ventricular systolic pressure
RWT	Relative Wall Thickness
SBP	Systolic Blood pressure
SD	Standard deviation
Sec	Second
SPAP	Systolic pulmonary artery pressure
SPSS	Statistical package for social science
SV	Stroke volume
TAPSE	Tricuspid Annular Plane Systolic Excursion
TDI	Tissue Doppler image
TR	Tricuspid Regurgitation
VCO_2	Rate of elimination of Carbon Dioxide
VE	Ventilator equivalent
VT	Ventilator threshold
βAR	β-adrenergic receptor

ABSTRACT

NYHA classification. Each patient performed a 6MWT and complete a forum of MLHFQ, offered an ECG gated echocardiographic study for assessment of systolic and diastolic functions of right & left ventricles.

Calculated MCF from the HF patients was compared with that obtained from 30 healthy subjects (Group A).

The goal of the study was to determine the correlation between myocardial contraction fractions (MCF), and functional status assessed by 6MWD & quality of life assessed by MLHFQ in HF patients NYHA class I – III.

Keywords: Right ventricular systolic pressure - Renin angiotensin converting enzyme Aldosterone system - Ischemic heart disease - Heart rate .

INTRODUCTION

Heart failure (HF) is a complex clinical syndrome that results from any structural or functional cardiac disorder that impairs the ability of the ventricle to fill with or eject blood [(1)]. HF is a global pandemic affecting an estimated 26 million people worldwide and resulting in more than one million hospitalizations annually. Although the outcomes for ambulatory HF patients with a reduced ejection fraction (EF) have improved with the discovery of multiple evidence-based drug and device therapies, hospitalized HF patients continue to experience unacceptably high post-discharge mortality and readmission rates that have not changed in the last 2 decades [(2)].

Functional capacity is considered to be an important clinical and prognostic measure in patients with HF [(3)]. The 6-minute walk test (6MWT) has classically been used in clinical settings to evaluate exercise capacity at submaximal exercise levels and has been shown to be an independent predictor of mortality and hospitalizations in patients with HF and a sensitive index to assess response to therapeutic interventions in HF [(4)].

Pathologic left ventricular remodeling is the final common pathway to heart failure, whether the initial stimulus is chronic pressure or chronic volume overload, genetically determined cardiomyopathy or myocardial infarction. Cardiac remodeling is generally accepted as a determinant of the clinical course of HF [(5)]. As cardiac remodeling of the left