العلاقة بين الكفاءة الوظيفية للأذين الأيسر والقدرة على بذل المجهود لمرضى اعتلال عضلة القلب التمددى

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توطئة للحصول على درجة الماجستير
فى أمراض القلب والأوعية الدموية

مقدم من

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RELATIONSHIP BETWEEN LEFT ATRIAL FUNCTION AND EXERCISE CAPACITY IN PATIENTS WITH DILATED CARDIOMYOPATHY

Thesis

Submitted for Partial Fulfillment of
Master Degree in Cardiology

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بسم اللّه الرحمن الرحيم

وَأَنْزَلَ اللهُ عَلَيْكَ
الْكِتَابَ والْحِكْمَةَ
وَعَلَّمَكَ مَا لَمْ
تَكُنْ تَعْلَمُ وَكَانَ
فَضْلُ اللهِ عَلَيْكَ
عَظِيمًا

صدق اللّه
العظيم
سورة النساء آية

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List Of Abbreviations

Abbrev.	Full term
2D	Two Dimensional
ABD	Automatic Border Detection
AEF	Active Emptying Fraction
AEV	Active Emptying Volume
AF	Atrial Fibrialtion
AR	Atrial Reverse \ Reversal
CAD	Coronary Artery Disease
CaO2	Arterial Oxygen Content
CHF	Congestive Heart Failure
CPET	Cardiopulmonary Exercise Testing
CvO2	Mixed Venous Oxygen Content
DCM	Dilated Cardiomyopathy
DD	Diastolic Dysfunction
DHF	Diastolic Heart Failure
DM	Diabetes Mellitus
DT	Deceleration Time
ECG	Electrocardiogram
EDD	End Diastolic Dimension
EDV	End Diastolic Volume
EF	Ejection Fraction
ESD	End Systolic Dimension
ESV	End Systolic Volume
FS	Fractional Shortening
HF	Heart Failure
HR	Heart Rate
HTN	Hypertension
IHD	Ischaemic Heart Disease
IVRT	IsoVolumetric Relaxation Time
LA	Left Atrium \ Atrial
LA V-max	Left Atrial Maximum Volume
LA V-min	Left Atrial Minimum Volume
LA Vp	Left Atrial Volume at peak of ECG P wave
LAEF	Left atrial Ejection Fraction

List Of Abbreviations (Cont...)

Abbrev.	Full term
LAFS	Left Atrial Fractional Shortening
LV	Left Ventricle \ Ventricular
LVEF	Left Ventricular Ejection fraction
LVH	Left Ventricular Hypertophy
MET	Metabolic Equivalent
MI	Myocardial Infarction
MM	M-Mode
MRI	Magnetic Resonance Imaging
MV	Mitral Valve
NYHA	New York Heart Association
PEF	Passive Emptying Fraction
PEV	Passive Emptying Volume
PVO2	Peak Oxygen uptake
RV	Right Ventricle \ ventricular
S1	First heart sound
S2	Second heart sound
SV	Stroke Volume
TDE	Tissue Doppler Echocardiography
TEE	Transesphageal echocardiography
TEF	Total Emptying Fraction
TEV	Total Emptying Volume
TTE	*Transthoracic* Echocardiography
VO2	Oxygen uptake

INTRODUCTION

Left atrial function is of great importance in diastolic function of normal heart as well as in the diseased heart, LA serves not only as a reservoir for the collection and storage of blood during left ventricular systole but also as a contractile pump to augment late left ventricular filling. Thus the evaluation of LA function as well as left ventricular function in diseased hearts is very useful for clinical decision-making particularly in the presence of heart failure ***(Rossi et al., 2007).***

Abnormalities of LA performance are clinically important and found in a wide variety of common clinical conditions such as AF, dilated cardiomyopathy (DCM), diastolic dysfunction (DD), and valvular heart disease ***(Stefanadis et al., 1998)***.

Left atrial function is associated with LV diastolic filling and cardiac output response to exercise. But the relation between LA function and exercise performance has not been adequately evaluated.

Previous studies have demonstrated that LV systolic function does not predict exercise capacity ***(Rihal et al., 1994)***.

In contrast, other reports showed that LV DD was intimately related to functional status ***(Davies et al., 1992).***

Many studies have described the contribution of LA function to LV diastolic filling. The LA acts as a reservoir during LV systole, and maintains passive filling during early diastole and active pumping during late diastole ***(Hoit and Gabel, 2000).***

In patients with LV dysfunction, the LA contribution to LV filling becomes more important. In the early stages of LV systolic dysfunction, early ventricular diastolic inflow is decreased, and consequently atrial passive emptying is decreased and atrial active pumping function in late diastole is increased. In this way, the LA reservoir, conduit, and pumping functions are reorganized and thus cardiac output is maintained. As HF progresses, LA function decreases as a result of increased afterload on the LA myocardium ***(Prioli et al., 1998)***.

Although LV DD is known to reduce exercise capacity, it is often difficult to predict precise exercise capacity by evaluating diastolic filling because hemodynamic parameters measured at rest are influenced by age, heart rate, loading condition, and the properties of the LV and LA. LA function is closely related to LV diastolic filling, therefore, indices of LA function may predict exercise capacity in patients with LV dysfunction ***(Kono et al., 1992)***.

In normal subjects, stroke volume increases as a result of increased heart rate and myocardial contractility and as a result of increased LV diastolic volume by means of the Frank-Starling mechanism ***(Sullivan et al., 1991).***

However, in patients with LV systolic dysfunction, maximal exercise cardiac output is primarily dependant on LV diastolic filling properties because of impaired myocardial contractility. Left ventricular diastolic filling is closely related to LV relaxation and elasticity and LA function ***(Spes et al., 1996).***

There are several mechanisms that explain the relationship between exercise capacity and LA function. Left atrial function reflects LV diastolic filling and therefore predicts the cardiac output and SV response to exercise ***(Jikuhara et al., 1997).***

In this study we will assess the relation between LA function and exercise capacity in idiopathic and ischaemic diated cardiomyopathy.

AIM OF THE WORK

The aim of this study was to investigate the relation between left atrial function and exercise capacity in dilated cardiomyopathy patients.