The Use of Myocardial Performance Index (Mpi) in Assessment of Heart Function

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Abstract

Background: Ejection fraction have been used frequently for assessment of the left ventricular function, but can be associated with errors in which myocardial performance index have been used as another parameter to measure the left ventricular function.

Objective: selecting another echocardiography parameter for the assessment of myocardial in function instead of the ejection fraction.

Methods: 160 patients referred to the echocardiogram unit from the period december 2007 to august 2008 requesting assessment of left ventricular function. After clinical examination, routine blood tests; chest x-ray and electrocardiographic recording have been completed. All patients informed to come for this unit after the first visit monthly for three successive months. For the purpose of comparison (30) thirty volunteers admitted to this study as control having same age range. The (160) patients were categorized into two groups.

Group (A) includes (70) patients with ischemic heart disease with complications like pulmonary oedema, myocardial infarction, recent admission to coronary care unit because of recurrent severs chest pain. Group (B) includes (90) patients with ischemic heart disease without any of the above complications. Myocardial performance index is done by using the four chambers view and pulse wave and curser along the mitral inflow of the blood jet.

Results: Assessment of left ventricular function by using the myocardial performance index in group A was more significant than using the ejection fraction in comparison to the control group (P value 0.02, 0.03 respectively) the same was found in group B in comparison to control group (P value 0.01; 0.05 respectively).

Conclusion The myocardial performance index (MPI) in the control groups was 0.44-0.36 MS indicating that its range is very narrow in the control group, The (MPI) in the two groups of patients was high in comparisons with control group.

Keyword: myocardial performance index (MPI), Left ventricle function.

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Introduction

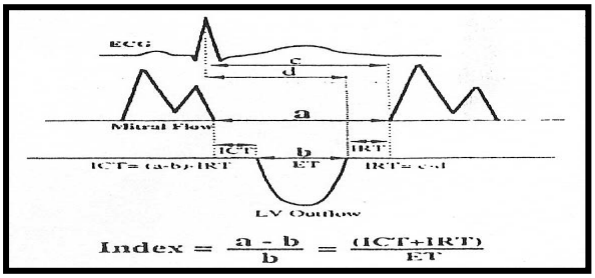
Assessment of cardiac performance especially the left ventricular function detsmined by the changes in before preload, afterload, myocardial contractility and heart rate[1]. The left ventricular function of two types systolic and diastolic function. Previus works were mainly concentrating on systolic function by measuring the ejection of action which can give sometime false readings. These false reading are due to changes in the shape of the left ventricular with some cardiac disorders like dilatation, aneurysm paradoxical motions [2]. Left ventricular diastolic function which precede systolic function along time before which can give an alarm to start medical treatment earlier. In order to measure both systolic and diastolic function at the some time ejection fraction was not helpful. So some studies went to use myocardial performance index as an alternative parameter to assess left ventricular function [3, 4].

Methods

160 patients (102 males and58 females) were referred to the echocardiogram unit at Baghdad teaching hospital with the provisional diagnosis of left ventricular dysfunction. Their age ranged from 50-70 years. All patients went through questionare consisting a list of full history clinical, radiological, electrocardiographic, and echocardiographic examination the echocardiographic examination was done on admission and for three successive months. For comparative reason thirty 30 volunteers were admitted in this study, All mated for sex and age. The 160 patients were divided into two groups.

Group A: 70 patients with ischemic heart disease having complications like pulmarary edema, myocardial infarction, recent admission to coronary care unit because of recurrent sever chest pain.

Group B: 90 patients having risk factors for the development ischemic heart disease without any cardiac complications mentioned in group A. To measure the myocardial performance index (MPI) four chambers view has been used with the cursor and pulse wave directed toward the rapid blood inflow at the mitral valve. Inflow, in correlation with the QRS complex an shown in the following diagram.



1. a is the distanse between the stop and the beginning material inflow.
2. IVCT=is the iso volumic contraction time.
3. b in the time needed to eject blood from the aortic valve and in equal to Ejection time.
4. IVRT is the isovolumic relaxatation time the relations between these distances can get a good assessment for the measurement of these systolic and diastolic dysfunstion the left ventricle.

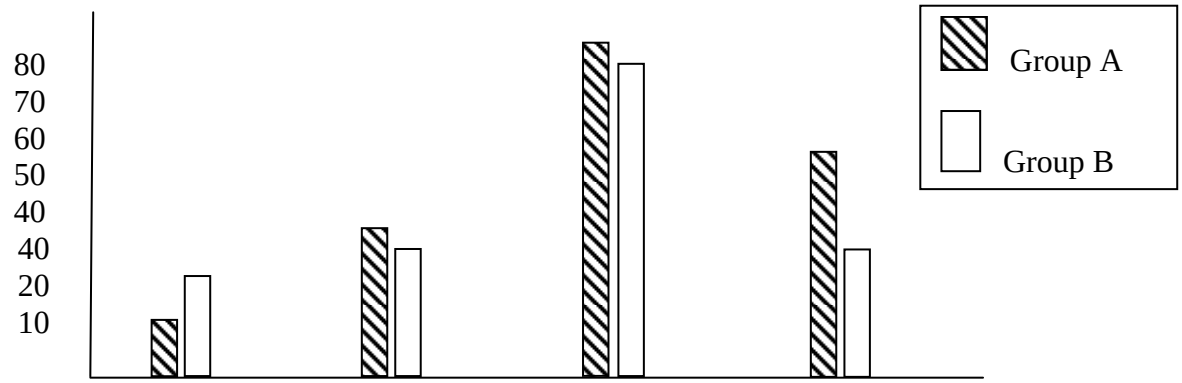
Results

From the 160 cases 102 male patients 63% from the total and 58 female patients 37% from the total enrolled in this study. The age range was 50-70 yeas. 60 patients in group Aand B have the flowing the behavior characteristic as in **(Table-1) and (Figure-1).**

(Table- 1)
Behavior characteristic of patients groups and control

Character	Male	Female
Age	50 ± 25	50 ± 20
Sex: M/F	80 / 50	22 / 8
Diabetes mellitus	18 (11 %)	7 (21 %)
Hyperlipidemia	70 (40 %)	8 (27 %)
smoking	125 (78%)	20 (66 %)
previous myocardial infarction	109 (68%)	
Hypertension	48 (30%)	6 (20%)

(Figure- 1)
The distribution of risk factors in the cardiac patients groups and control group.



This histogram demonstrates that the presences of risk factors are seen in both groups regardless of the presence or absence of any cardiac complications.

The echocardiography parameters (mean± SD) have been shown in table 2.

(Table- 2)
Echocardiographic parameters in the patients and control groups.

Echocardiography parameters	Group A	group B	Control
Ejection time (ms)	228 ± 44	272 ± 38	320 ± 45
isvolumic relaxation time (ms)	29 ± 1.7	68 ± 50	79 ± 7
isorolamic contraction time (ms)	150 ± 42	96 ± 25	30 ± 6
Myocardial performance index	1.04 ± 10-8	070 ± 0.24	0.42 ± 0.06
Ejectio fraction (EF %)	32 ± 4	44 ± 5	69 ± 5

The comparison between the values of ejection fraction and the values of myocardial performance index in the assessment of left ventricular function was shown in table 3and4.

(Table-3)
Shows the ejection fraction myocardial performance index in group A the control group

Echocardiography parameters	group A	Control group	P Value
Ejection fraction %	32 ± 4	69 ± 5	< 0.03
myocardial performance index (ms)	1. 4 ± 108	0.42 ± 0.06	< 0.02

P. value was more significant when using myocardial performance index instead of the ejection fraction in assessing the left ventricular function.

(Table- 4)
The ejection fraction / myocardial performance index

Echocardiography parameters	group B	control	P. value
Ejection fraction %	44 ± 5	69 ± 5	<0.05
myocardial performance index	070 ± 02.4	042 ± 0.6	<0.01

P. Value was less then 0.01 by using the myocardial performance index.
The results showed that myocardial performance index was more significant if correlate both group AandB with the control group. Regarding group A by using the myocardial performance index the P- value was 0.02 (more significant than using the ejection fraction, P<0.03), in addition the myocardial performance index in group B was more significant (P-value <0.01) than using the ejection fraction (P-value <0.05).

Discussion

This study showed that using myocardial performance index was more accurate because easy to measure, non invasive, not affected by the change of the shape and left ventricle, it can also give an idea about both systolic aid diastolic dysfunction.
There are many repots agree with this study confirmed the value of myocardial performance index in assessing cardiac performance[5] Policlinco et al, made comparison between normal people and patients with diseased myocardium[6,7],another study published from the catholic university of sacred heart, Italy in which they used the myocardial performance index to assess left ventricular function after myocardial infarction and proved its positivity in giving the accurate results[4,5,6] using myocardial performance index in assessment of patients with heart failure gave better prognostic value than other parameters[8].
There was also a place for using of myocardial performance index in congenital heart disease [9,10] in which has been used successfully in isolated patients of right to left shunt so we can conclude now that the myocardial performance index can be used in different cardiac conduction with good results [11,12,13,14].

Recommandation

1) Using the myocardial performance index in different medical disorders can solve many contradictory points.
2) The doctors practicing on echocardiogram must be encouraged to use this index as complementary to ejection fraction.
3) The use of myocardial performance index open the door for further use of other new echocardiographic parameters.

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