Al-Azhar Med. J.(Cardiology). *Vol. 50(4), October, 2021, 2845-2856*
DOI: 10.21608/amj.2021.196425
https://amj.journals.ekb.eg/article_196425.html

ECHOCARDIOGRAPHIC ASSESSMENT OF RIGHT VENTRICULAR FUNCTION AFTER SUCCESSFUL REVASCULARIZATION FOR ACUTE ANTERIOR MYOCARDIAL INFARCTION WITHOUT RIGHT VENTRICULAR INFARCTION

By

Mohamed El-Sayed Hammad, Mohamed Sami Abd El-Samea and Abd El-Mohsen Mostfa

Department of Cardiology, Faculty of Medicine, Al-Azhar University, Cairo, Egypt

Corresponding author: Mohamed El-Sayed Hammad

E-mail: ma102416@gmail.com

ABSTRACT

Background: Right ventricular (RV) affection in acute left ventricular (LV) myocardial infarction (MI) is frequently underestimated in the clinical setting as the diagnostic limitations of the electrocardiogram and echocardiography.

Objective: To assess RV function in patients presented with first acute anterior ST elevation myocardial infarction (STEMI) who underwent successful primary percutaneous coronary intervention (PCI) and factors affecting it.

Patients and Methods: Forty consecutive patients with anterior STEMI who underwent successful primary PCI in the Cathetrization (cath) labs of Al-Azhar University Hospitals, Cairo, Egypt from March 2019 to April 2020 for first acute anterior STEMI without RV were enrolled in the study. Presence of a coexisting clinical condition that might affect RV function, patients with RV infarction or those having significant stenosis (>50%) affecting RV branch or right coronary artery proximal to RV branch were excluded. Echocardiography was performed during the hospital stay to assess the LV and RV systolic and diastolic functions with special focus on tricuspid annular plane systolic excursion, mid RV end-diastolic dimension, right atrial area, RV fractional area change, and tissue Doppler-derived myocardial performance index.

Results: RV dysfunction, according to our definition in the first anterior MI, occurred in (55%) of the study population. Independent predictors for abnormal RV function were left circumflex artery mid or proximal affection, eventful procedure, occurrence of no reflow, glucose level, LV end-systolic dimension, LV end-diastolic dimension, and LV ejection fraction.

Conclusion: RV dysfunction is detected in anterior myocardial infarction after successful revascularization. Several echocardiographic parameters may be possible measures for RV dysfunction including RVFAC, TAPSI, MPI and S'.

Keywords: Acute myocardial infarction, Myocardial performance index, Right ventricle.

INTRODUCTION

Right ventricular (RV) involvement after an acute left ventricular (LV) myocardial infarction (MI) has been shown to be associated with higher morbidity and mortality. The prevalence of RV involvement in acute LV MI reportedly ranges from 50% to 80% in

postmortem and animal studies but is frequently underestimated in the clinical setting owing to the diagnostic limitations of the electrocardiogram (ECG) and echocardiography (Jensen et al., 2010). Quantitative assessment of RV function is often difficult using the various noninvasive imaging modalities owing to the inherently complex geometry of the right ventricle *(Hsu et al., 2013).*

Echocardiography remains the most commonly used technique for RV function assessment in clinical practice because of its widespread availability. The myocardial performance index (MPI) of RV based on conventional Doppler echocardiography has been proven to be useful in the evaluation of RV function and recommended as one of the initial quantitative measurements of RV diastolic function and may be a sensitive tool for detecting ‘‘occult’’ RV dysfunction in acute LV MI *(Hsu et al., 2013).*

The aim of this study was to assess RV function in patients with successful primary percutaneous coronary intervention (PCI) for acute anterior ST elevation myocardial infarction (STEMI) without RV infarction and determine factors affecting it.

PATIENTS AND METHODS

The current study enrolled 40 patients who underwent successful primary PCI in the Cath labs of Al-Azhar University Hospitals, Cairo, Egypt from March 2019 to April 2020 for first acute anterior STEMI without RV infarction.

Inclusion criteria: All patients with the definite diagnosis of anterior STEMI as per the universal definition were enrolled. Patients underwent angiographically successful primary PCI defined as successful deployment of stent in culprit infarct related artery (IRA), no residual dissection, and less than 20% residual stenosis in IRA *(Thygesen et al., 2012).*

Exclusion criteria: Patients with any of the following criteria were excluded from the study:

1. Presence of RV infarction defined by an ST-segment elevation of 0.1 mV or greater in lead V4R on ECG at presentation.
2. Previous history of MI or coronary revascularization.
3. Persistent hemodynamic instability necessity use of positive inotropes.
4. Atrial fibrillation.
5. Moderate or severe valvular heart disease.
6. Presence of a coexisting clinical condition that might affect RV function, including pericardial disease, chronic lung disease, pulmonary hypertension, or connective tissue disorder.
7. Patient with contraindication for coronary angiography such as severe renal impairment, coagulopathy, etc.
8. Patient with significant stenosis (>50%) affecting RV branch or right coronary artery proximal to RV branch.
9. Consent refusal.

Patients who met the inclusion criteria were subjected to the following:

1. Thorough history taking.
2. Full clinical examination: Targeted physical examination data were

recorded including general and local examination with special attention to vital data and signs suggestive of risk factor for coronary artery disease (CAD), mechanical complications, signs of heart failure, and Killip classification.

3. Twelve-lead surface ECG was performed on admission, 90 minutes after reperfusion, then every 8 hours in the first 24 hours, then daily thereafter to confirm the diagnosis of STEMI and to exclude the presence of RV infarction, and to follow up the ST segment resolution time.
4. Primary PCI after diagnostic coronary angiography, stenting with or without balloon predilation, then assessment of post procedure flow using thrombolysis in MI, i.e. TIMI.
5. Echocardiography was performed within 72 hours of successful reperfusion. I did a comprehensive 2D Doppler echocardiography and pulsed-wave TDI while the patients were lying in the partial left lateral decubitus position during either shallow respiration or a breath hold:
    1. The LV end-systolic dimension (LVESD) and end diastolic dimension (LVEDD) were obtained from M-mode recording, from the parasternal long axis view. The LV ejection fraction (LVEF) was estimated by M-mode in para strenal long axis view.
    2. The 16-segment model for LV segmentation was used to evaluate regional wall motion abnormalities as recommended by the American Society of echocardiography *(Lang et al., 2005).*
    3. The RV end-diastolic dimension was assessed at the mid-cavity of the right ventricle in the apical four-chamber view.
    4. The RV fractional area change (RVFAC) was calculated as the RV end-diastolic area– the end-systolic area/the RV end-diastolic area.
    5. The right atrial area (RAA) was estimated by planimetry at the end of ventricular systole.
    6. The tricuspid annular plane systolic excursion (TAPSE) was measured from the apical four-chamber view at the RV free wall level by placing an M-mode cursor passed through the tricuspid lateral annulus in apical four-chamber view, and measuring the amount of longitudinal displacement of the annulus at peak-systole.
    7. The trans-mitral and -tricuspid Doppler flow velocities were recorded from the apical four chamber view with the sample volume placed between the tips of the mitral and tricuspid valves, respectively, and the peak early filling velocity (E), peak atrial velocity (A) were measured, and E/A ratio was calculated.
    8. Pulsed-wave TDI images were acquired from the standard apical four chamber view, a 5.2-mm sample volume was placed at the lateral tricuspid annulus, mitral septal, and mitral lateral annar sites to obtain the spectral pulsed

tissue Doppler data. Three cardiac cycles were averaged for each TDI measurement.

Peak systolic annular velocity (Str), early diastolic annular velocity (Etr), and late diastolic annular velocity (Atr) of the right ventricle were measured offline; and the Etr/Atr and E/Etr ratios were calculated. Isovolumic relaxation time (IVRT) was measured as the time interval from the end of Str to the onset of Etr, isovolumic contraction time (measured as the time interval from the end of the Atr to the beginning of the Str), and ejection time (measured from the onset to the end of Str) of the right ventricle were calculated to obtain the TDI derived RV MPI with the formula: IVRT+ isovolumic contraction time/ejection time. MPI was defined **as an MPI >0.55**.

Patients were assigned as having abnormal RV function if they had a combination of at least two of: RVFAC <35%, RV MPI using TDI >0.55, TAPSE <16 mm *(Rudski et al., 2010).*

Statistical analysis:

Data were analyzed using Statistical Package for the Social Science (SPSS) version 20. Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage. Comparisons were made between the two groups using t test for continuous variables and Chi-square test. Difference was considered statistically significant when $p < 0.05$.

RESULTS

The mean age of our patients was 55.85±9.2 years old, 24(60%) were males, (62.5%) were smokers, 30(75%) were diabetic, 30(75%) were hypertensive, 18(45%) were dyslipidemia, and 15(37.5%) had positive family history premature CAD.

Echocardiographic finding analysis showed that the mean EF (43.15±9.39) LVESD was (29.20±6.93) mm, LVEDD was (53.10±3.14) mm, whereas mean LAD was (36.93±2.53) mm.

With regard to RV function, the mean RVEDD was 29.50±3.04 mm, RVFAC was 36.88±5.94%, RAA was 19.98±1.64 cm2, TAPSE was 18.78±4.88 mm, MPI was 64.18±15.42, and S' ratio was 9.22±0.77 **(Table 1)**.

Table (1): Analysis of echocardiographic parameters

Echocardiographic parameters		Patients (n = 40)
LAD (mm)	Mean ± SD	36.93 ± 2.53
	Range	31-42
LV EDD (mm)	Mean ± SD	53.10 ± 3.14
	Range	48-59
LV ESD (mm)	Mean ± SD	29.20 ± 6.93
	Range	3-41
LV EDV (ml)	Mean ± SD	99.10 ± 18.04
	Range	60-139
LV ESV (ml)	Mean ± SD	56.23 ± 13.69
	Range	34-90
LV EF (%)	Mean ± SD	43.15 ± 9.39
	Range	25-57
RV Dimensions (mm)	Mean ± SD	29.50 ± 3.04
	Range	21-35
RAA (cm)	Mean ± SD	19.98 ± 1.64
	Range	17-24
RVFAC (%)	Mean ± SD	36.88 ± 5.94
	Range	30-50
TAPSI (mm)	Mean ± SD	18.78 ± 4.88
	Range	13-29
MPI (%)	Mean ± SD	64.18 ± 15.42
	Range	49-94
S’	Mean ± SD	9.22 ± 0.77
	Range	8-11

Additionally, we found that in coronary angiography, LAD affection was about 32.5% in proximal segment, 45% in mid segment, 5% in proximal to mid part 12.5% in osteal segment, and 5% multiple lesions, while LCX affection was about 40% in proximal part 17.5%, mid part 22.5%, and 60% non-significant lesion **(Table 2)**.

Table (2): Data showing analysis of CA findings

CA parameters		Patients (n = 40)
LAD lesion	Proximal	13 (32.5%)
	Mid	18 (45%)
	Proximal to mid	2 (5%)
	Osteal	5 (12.5%)
	Multiple lesions	2 (5%)
LCX lesion	Prox	7 (17.5%)
	Mid	9 (22.5%)
	Non-significant lesion	24 (60%)
DOMINANCE	Yes	10 (25%)
	No	26 (65%)
	Co	4 (10%)
PCI	1DES	21 (52.5%)
	2DES	17 (42.5%)
	3DES	2 (5%)

According to RV function assessment by echocardiography patients were classified into two groups: Group 1 (n= 22) had impaired RV function, and Group 2 (n= 18) with normal RV function. By analysis and comparison of collected data, there were no difference in terms of Age (P value= 0.938), gender (P value = 0.436), diabetes mellituss (DM) (P value = 0.140), hypertension (HTN) (P value = 0.465), smoking (P value = 0.87), family history (P value = 0.623) and dyslipidemia (P value = 0.482) **(Table 3)**.

Table (3): Comparison between normal and impaired RV function according to the age, sex and CV risk factors

Parameters \ Groups		Impaired RV function (n = 22)	Normal RV function (n = 18)	P value
Age	Mean ± SD	55.59 ± 9.87	55.72 ± 8.58	0.938
	Range	41-71	40-73	
Sex	Male	12 (54.5%)	12 (66.7%)	0.436
	Female	10 (45.5%)	6 (33.3%)	
CV RISK	DM	19 (86.4%)	11 (61.6%)	0.140
	HTN	15 (68.2%)	15 (83.3%)	0.465
	Smoking	14 (63.6%)	11 (61.1%)	0.87
	Family history	9 (40.9%)	6 (33.3%)	0.623
	Dyslipidemia	11 (50%)	7 (38.9%)	0.482

Different several echocardiographic LV parameters were compared in both groups including LAD (P value=0.743), LV EDD (P value=0.327), LV ESD (P value=0.375), LV EDV (P value =0.427), LV ESV (P value=0.081) and LV EF (P value=0.071). However, both LV ESV and LV EF nearly reached a significance level in impaired RV function group **(Table 4)**.

Table (4): Comparison of echocardiographic findings in both groups of normal and impaired RV function groups

Parameters \ Functions		Impaired RV function group (n = 22)	Normal RV function group (n = 18)	P value
LAD (mm)	Mean ± SD	37.05 ± 2.89	36.78 ± 2.07	0.743
	Range	31-42	33-40	
LV EDD (mm)	Mean ± SD	53.55 ± 3.38	52.56 ± 2.81	0.327
	Range	48-59	48-57	
LV ESD (mm)	Mean ± SD	30.09 ± 8.01	28.11 ± 5.33	0.375
	Range	3-41	23-39	
LV EDV (ml)	Mean ± SD	101.18 ± 20.94	96.56 ± 13.88	0.427
	Range	60-139	70-118	
LV ESV (ml)	Mean ± SD	59.64 ± 13.96	52.06 ± 12.48	0.081
	Range	34-90	34-76	
LV EF (%)	Mean ± SD	40.73 ± 8.74	46.11 ± 9.55	0.071
	Range	25-52	25-57	
RV Dimensions (mm)	Mean ± SD	29.95 ± 2.97	28.94 ± 3.11	0.302
	Range	23-35	21-34	
RAA (cm)	Mean ± SD	20.09 ± 1.69	19.83 ± 1.62	0.628
	Range	18-24	17-22	
RVFAC (%)	Mean ± SD	32.45 ± 1.77	42.28 ± 4.56	<0.001
	Range	30-35	30-50	
TAPSI (mm)	Mean ± SD	15.14 ± 1.28	23.22 ± 3.81	<0.001
	Range	13-17	14-29	
MPI (%)	Mean ± SD	52.27 ± 1.61	78.72 ± 11.62	<0.001
	Range	49-55	52-94	
S’	Mean ± SD	8.63 ± 0.41	9.94 ± 0.36	<0.001
	Range	8-9.3	9.5-11	

LCX affection was statistically associated with RV dysfunction than LAD. The incidence of significant lesion in LCX was high in RV impaired function group (63.7%) compared to 11.1% in normal RV function group (P value = 0.003) **(Table 5)**.

Table (5): Comparison between coronary angiographic findings in both normal and impaired RV function groups

Parameters \ Functions		Impaired RV function group (n = 22)	Normal RV function group (n = 18)	P value
LAD lesion	Proximal	6 (27.3%)	7 (38.9%)	0.942
	Mid	11 (50%)	7 (38.9%)	
	Proximal to mid	1 (4.5%)	1 (5.6%)	
	Osteal	3 (13.6%)	2 (11.1%)	
	Multiple lesions	1 (4.5%)	1 (5.6%)	
LCX lesion	Prox	6 (27.3%)	1 (5.6%)	**0.003**
	Mid	8 (36.4%)	1 (5.6%)	
	Non-significant lesion	8 (36.4%)	16 (88.9%)	
DOMINANCE	Yes	7 (31.8%)	3 (16.7%)	0.053
	No	15 (68.2%)	11 (61.1%)	
	Co	0 (0%)	4 (22.2%)	
PCI	1DES	12 (54.5%)	9 (50%)	0.275
	2DES	10 (45.5%)	7 (38.9%)	
	3DES	0 (0%)	2 (11.1%)	

DISCUSSION

Right ventricular (RV) involvement after an acute left ventricular (LV) myocardial infarction (MI) has been shown to be associated with higher morbidity and mortality *(Jensen et al., 2010).* This current study exclusively included patients with anterior STEMI without concomitant RV infarction by ECG to assess RV function. 55% of patients had impaired RV function.

In comparison to our results, some previous studies evaluated RV function after MI without RV infarction. *Jensen and his Colleagues (2010)* showed that RV involvement was diagnosed in 47% of cases with inferior STEMI and in 65% of cases with of cases with anterior STEMI. *Masci and his Collagues (2010)* concluded that early post infarction RV ischemic injury is common (approximately one-third to one-half of the patients) in patients without clinical evidence of hemodynamic RV compromise and is characterized by the presence of myocardial edema, late gadolinium enhancement, and functional abnormalities. RV injury is not limited to inferior infarcts but is commonly found in anterior infarcts as well. *Kidawa et al. (2010)* found that 64% of their patients had RV dysfunction measured by TAPSE. This higher incidence may be explained by the fact that they included all STEMI patients with possible occurrence of RV infarction in addition to the different assessment parameters.

We compared different echocardiographic parameters in patients with evidence of impaired RV function to those without. Several LV parameters were comparable in both groups including LAD, LV EDD, LV ESD, LV EDV, LV ESV and LVEF. However, both LV ESV and LV EF nearly reached a significance level.

In our study, we found that age of patients had no significant difference in both groups, which was supported by *Hsu et al. (2013)* who found no association

between increasing age and the depressed RV function and abnormal MPI.

A study evaluated patients underwent successful reperfusion of a first episode of acute MI using echocardiography. At the acute phase of MI, RVEF, RVFAC and RV, global strain were affected in both inferior and anterior MI but these parameters were lower inferior MI than in anterior MI *(Huttin et al., 2015).*

In patients with a first, acute reperfused STEMI without associated RV infarction, RV function may be affected discrepantly depending on the different infarction sites. In patients with inferior infarction without concomitant RV infarction, only regional RV diastolic dysfunction is observed, whereas the alteration of global RV function is more pronounced in patients with anterior wall infarction *(Hsu et al., 2011).* The anterior portion of the RV has a dual coronary blood supply that consists of RV branches from the LAD coronary artery and the conus branch of the RCA. So, it is supposed that RCA ensure blood supply to the right ventricle in cases of anterior LV infarction. But our study highlights RV dysfunction could develop in anterior MI.

Additionally, we found that LCX affection was statistically associated with RV dysfunction than LAD. The incidence of non-significant lesion in LCX was lower in RV impaired function group (36.4%) compared to 88.9% in normal RV function group.

Our findings were not affected by underlying confounding patients related factors, both impaired and normal RV function groups were not statistically different in terms of age, gender, DM, HTN, smoking, family history and dyslipidemia.

CONCLUSION

RV dysfunction was detected in anterior myocardial infarction after successful revascularization. Several echocardiographic parameters may be possible measures for RV dysfunction including RVFAC, TAPSI, MPI and S'.

REFERENCES

1. **Hsu Y, Jeng F and Shan-H. (2011):** Right ventricular function in patients with different infarction sites after a first acute myocardial infarction. Am J Med Sci, 342, 474-9.
2. **Hsu Y, Chang H, Liu J, Lin F, Ko and Cheng T. (2013):** Correlates of impaired global right ventricular function in patients with reperfused acute myocardial infarction and without right ventricular infarction. J Investig Med., 61:715–721.
3. **Huttin O, Jérémie L, Marine D. M, Nicolas G, Damien M, Frédéric M, Simon L, Yves J, Jacques F, Pierre Y M and Christine S. (2015):** Assessment of right ventricular functional recovery after acute myocardial infarction by 2D speckle-tracking echocardiography. Int J Cardiovasc Imaging, 31, 537-45.
4. **Jensen C J., Markus J, Peter H, Georg V. S, Thomas S and Oliver B. (2010):** Right ventricular involvement in acute left ventricular myocardial infarction: prognostic implications of MRI findings. AJR Am J Roentgenol, 194, 592-8.
5. **Kidawa M, Kasprzak J, Wierzchowski T and Krzeminska P.**

(2010): Right ventricular function suffers from reperfusion delay: tissue Doppler study. Clin Cardiol., 33:E43–8.

6. **Lang M., Bierig M., Devereux B., Flachskampf A., Foster E. and Pellikka A. (2005):** Recommendations for chamber quantification: a report from the American Society of Echocardiography's Guidelines and Standards Committee and the Chamber Quantification Writing Group, developed in conjunction with the European Association of Echocardiography, a branch of the European Society of Cardiology. J Am Soc Echocardiogr, 18: 1440-63.
7. **Masci G, Marco F, Walter D, Javier G, Giancarlo T, Rocco D, Valeria S, Iacopo C, Matteo M, Elisabetta S, Carlo C, Massimo L, Luciano A, Stefan J and Jan B. (2010):** Right ventricular ischemic injury in patients with acute ST-segment elevation myocardial infarction: characterization with cardiovascular magnetic resonance. Circulation, 122: 1405-12.
8. **Rudski L, Lai W, Afilalo J, Hua L, Handschumacher M and Chandrasekaran K. (2010):** Guidelines for the echocardiographic assessment of the right heart in adults. J Am Soc Echocardiogr, 23: 685-713; quiz 786-8.
9. **Thygesen K, Alpert J, Jaffe A, Simoons M, Chaitman B and White H. (2012):** Third universal definition of myocardial infarction. Eur Heart J, 33: 2551-67.

تقييم وظيفة البطين الأيمن بالموجات فوق الصوتية ثنائية الأبعاد في مرضى احتشاء عضلة القلب الأمامي بعد التروية الناجحة

محمد السيد حماد*، محمد سامي عبدالسميع، عبدالمحسن مصطفى عبده***

قسم القلب والأوعية الدموية، كلية الطب، جامعة الأزهر

E-mail: ma102416@gmail.com

خلفية البحث: تقييم تأثر البطين الأيمن في مرضى إحتشاء عضلة القلب اليسرى لا يتم تقديره بالصورة الكاملة وذلك لمحدودية أدوات التشخيص وهي رسم القلب والموجات الصوتية.

الهدف من البحث: تقييم وظيفة البطين الأيمن بالموجات فوق الصوتية في مرضى احتشاء عضلة القلب الأمامي بعد التروية الناجحة والعوامل المؤثرة عليه.

المرضى وطرق البحث: ضمت الدراسة الحالية 40 مريضًا ممن خضعوا لعملية التروية الناجحة عن طريقالقسطرة التداخلية عن طريق الجلد في مستشفيات جامعة الأزهر، القاهرة، وقد خضع جميع المرضى للموافقه علي الدراسه وأخذ تاريخ كامل للمرض بما في ذلك تحديد عوامل الخطر كوجود إرتفاع فى ضغط الدم او إرتفاع نسبه السكر بالدم أو التدخين أو وجود تاريخ مرضي لأمراض الشرايين التاجية أو ارتفاع نسبة الدهون بالدم كما تم تقييم المرضى من الناحية الأكلينيكية وعمل تخطيط كهربية القلب وأيضا اجراء القسطرة التداخلية للتروية الناجحة. قمنا بتقييم العديد من معلمات تخطيط صدى القلب مثل أبعاد الأذين الأيسر وبعد البطين الأيسر في نهاية الأنقباض وكذلك الأنبساط و كذلك حجم البطين الأيسر في نهاية الأنقباض وكذلك الأنبساط وأيضا كفاءة عضلة القلب وأبعاد البطين الأيمن ومساحة الأذين الأيمن ومعدل التغير في مساحة البطين الأيمن ومعدل الانحراف الأنقباضي للصمام ثلاثي الشرفات ومؤشر أداء عضلة القلب بواسطة دوبلر الأنسجة إلى جانب البيانات الديموغرافية الأساسية والعوامل المشتركة.

نتـــائج البحـــث: كـــان متوســـط عمـــر الحـــالات المشـــمولة 55.85 (± 9.2)، 60٪ مـــن الـــذكور، 40٪ مـــن الإنـــاث، 75٪ لـــديهم DM، ٪75 كـــان لـــديهم HTN، ٪62.5 كـــانوا مـــدخنين، 45٪ كـــان لـــديهم اضـــطراب دهـــون الـــدم و37.5٪ لـــديهم تـــاريخ عـــائلي إيجابي.كانـــت وظيفـــة البطـــين الأيمـــن علـــى النحـــو التـــالي؛ كـــان متوســـط مســـاحة الأذيـــن الأيمـــن (19.98 ± 1.64) ســـم 2، وكـــان معـــدل التغيـــر فـــي مســـاحة البطـــين الأيمـــن (± 5.94 %), 36.88، وكـــان معـــدل الانحـــراف الأنقباضـــي للصـــمام ثلاثـــي الشـــرفات(18.78 ± 4.88) ملـــم، وكـــان مؤشـــر أداء عضـــلة القلـــب بواســـطة دوبلـــر الأنســـجة(64.18 ± 15.42) ووجـــد أن 22 مريضًـــا مـــن أصـــل 40 مريضًـــا يعـــانون مـــن ضـــعف وظيفـــةالبطين الأيمـــن. علـــى حســـب التعريـــف الموضـــوع لضـــعف البطـــين الأيمـــن وهـــو تـــوافر اثنـــين مـــن ثلاثـــة قياســـات وهـــي معـــدل التغيـــر فـــي مســـاحة البطـــين الأيمـــن و معـــدل الانحـــراف الأنقباضـــي للصـــمام ثلاثـــي الشـــرفات و مؤشـــر أداء عضـــلة القلـــب بواســـطة دوبلر الأنسجة.

الإســـتنتاج: تـــأثر وظيفـــة البطـــين الأيمـــن مرتبطـــاً إحصـــائيا بـــاعتلال الشـــريان المحـــيط الأيســـر أكثـــر مـــن الشـــريان الأيســـر الأمـــامي النـــازل , وهنـــاك إرتبـــاط ضـــعيف بـــين كفـــاءة عضلة القلب اليسرى وإعتلال البطين الأيمن.

الكلمـــات الدالـــة: إحتشـــاء حـــاد بعضـــلة القلـــب، مؤشـــر أداء عضـــلة القلـــب بواســـطة دوبلـــر الأنسجة، البطين الأيمن.