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Assessment of the left ventricle function using Two-Dimensional Speckle-Tracking Echocardiography among patients with chronic Hepatitis C infection with preserved left ventricle ejection fraction

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Abstract

Background: Subclinical left ventricle dysfunction among patient with chronic hepatitis C is under detected and therefore untreated. The current study aimed to use the Two-Dimensional Speckle tracking echocardiography in the assessment of global and regional function of the left ventricle (LV) myocardium in chronic viral hepatitis C patients with preserved left ventricle ejection fraction (LVEF). **Methodology:** In this cross-sectional study, 100 participants were divided into 2 groups; 50 patients with chronic hepatitis C and 50 normal healthy matched volunteers as controls. All participants were investigated using conventional echocardiography and 2D speckle tracking. **Results:** There was no statistically significant difference between hepatitis C group in comparison with control group according to Ejection Fraction (EF%) and fraction shortening (FS) (P= 0.074 and 0.393, respectively). It was be found that 14% of patients suffered from abnormal global longitudinal strain regardless a normal Left ventricular ejection fraction (LVEF). There was significant difference at the level of average GLS (P < 0.001) and as regard regional longitudinal strain, there were significant difference in many segments either basal segments showed in anteroseptal PLSS, inferolateral PLSS, inferior PLSS and infero-septal Peack longitudinal systolic strain (PLSS) (P= 0.012, 0.02, 0.011 and 0.001, respectively). Mid segments in anteroseptal PLSS, anterior PLSS A, anterolateral PLSS A and infero-lateral PLSS A (P= 0.003, 0.011, 0.002 and <0.001, respectively) and Apical segments in anterior PLSS B, lateral PLSS and Septal PLSS (P= 0.013, 0.001 and 0.031, respectively). **Conclusion:** In chronic hepatitis C patients, left ventricle systolic dysfunction is significantly more common when assessed by global longitudinal strain than by 2D LVEF. To signalize patients with subclinical left ventricle systolic dysfunction irrespective a normal LVEF, 2D STE may be useful for the long-term handling in this high-risk populationm.

Keywords: Chronic viral hepatitis C; Subclinical left ventricle dysfunction; Two-Dimensional Speckle-Tracking Echocardiography.

INTRODUCTION

Hepatitis C virus (HCV) infection is the second most common chronic viral infection in the world with a global prevalence of about 3% (170 million people) [1]. So far, few cardiologists are aware of HCV as the cause of heart disease and its treatment [2]. HCV infection is visible worldwide and is usually not detected and treated. HCV-derived heart disease is a chronic, persistent and destructive disease [3].

HCV would be able to increase the cardiovascular risk. The role of HCV in the pathogenesis of atherosclerosis and cardiovascular events remains unclear. HCV infection is thought to cause chronic immune stimulation, leading to inflammation and cytokine production [4].

These altered cytokine profiles observed in the chronic HCV environment may lead to poor cardiovascular outcomes. Therefore, HCV induces inflammatory cytokines, thereby increasing the expression of intracellular adhesion molecules, anti-endothelial antibodies, and the production of oxidative stress, producing insulin resistance (IR), interfering with lipid metabolism, and interacting with type 2 diabetes (DM) and Systemic vasculitis [5]. However, HCV is associated with favorable blood lipid profiles, lower cholesterol and low-density lipoprotein levels [6, 7].

The correlation between HCV infection and coronary atherosclerosis remains controversial. Hepatitis C virus infection promotes atherosclerosis through viral load and steatosis, leading to inflammation and immune-mediated reactions and metabolic disorders [8].

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Myocarditis and cardiomyopathy can also be caused by the hepatitis C virus directly damaging cardiac structures; however, the precise mechanism through which the virus affects the myocardium remains a mystery [9].

In speckle-tracking echocardiography, 2D images are used to gather information about global and regional myocardial deformation without the limitations of Doppler methods, provides a comprehensive analysis of global and regional myocardial deformation evaluated in all spatial directions.

The Speckle-Tracking Echocardiography technique also provides information about LV rotation and torsion dynamics, which could previously only be evaluated using MRI prior to its introduction. Speckle-tracking echocardiography has demonstrated good reproducibility, accuracy, and feasibility in several clinical settings over the last few years [10].

The assessment of LV function, wall thickness, cavity size and ejection fraction with transthoracic echocardiography should be based on existing guidelines. Even in symptomatic patients, the left ventricular ejection fraction is often normal [11]. Thus, it is hard to evaluate latent change in left ventricle function depending on Left ventricular ejection fraction.

Using two-dimensional speckle tracking imaging, myocardial strain can be measured angle-independently. As a result, it provides a more accurate characterization of subtle changes in left ventricular function than left ventricular ejection fraction [12].

Deformation imaging using 2D speckle tracking echocardiography has been shown to be more accurate than LVEF in detecting myocardial contractility [13]. The 2D-STE is more informative than conventional echocardiography in diagnosis of subclinical ventricular dysfunction in different clinical interference [14]. Although the correlation between the presence and severity of hepatitis and/or cirrhosis and LV function has been investigated in most echocardiographic studies, limited number of studies have examined the regional function of the LV using 2D-STE in cirrhotic patients, mainly alcoholic patients and no studies in chronic hepatitis C patients [15].

This work aimed to diagnose the function of the left ventricle (LV) myocardium using 2D-STE echocardiography in chronic viral hepatitis C patients with preserved LV ejection fraction and to assess the connection between the chronicity and severity of virus C and the left ventricle ejection fraction (LVEF).

PATIENTS AND METHODS

Study population

In this cross-sectional study, 100 participants were enrolled and divided into two groups; 50 normal healthy volunteers as a control group (28 male and 22 female) with mean age 49.4 ± 8. and another 50 patients with chronic hepatitis C (24 male and 26 female) with mean age 51.32 ± 6.4 selected from patients visited outpatient clinic in Mansoura Specialized Medical Hospital for follow up and treatment in period between September 2016 to September 2017. left ventricle dysfunction was defined as Global longitudinal strain (GLS) (≤|16|%), FS of < 27% or LVEF of < 55%.

The exclusion criteria were evidence of coronary artery disease CAD, evidence of significant valvular diseases, poor transthoracic echo window, evident left ventricular dysfunction (EF<50%) and patients with other comorbidities affecting the natural history of the diseases (end stage kidney disease, advanced metastatic non-curable malignancy, atrial fibrillation (AF), Left bundle branch block (LBBB), Paced rhythm, chronic obstructive pulmonary disease (COPD), Pulmonary embolism (PE) or any other chronic respiratory conditions with pulmonary hypertension (PHTN) with RV systolic pressure by Echo >40 mmHg.

Methodology

After giving a written informed consent from patient and control groups, the full history was documented, clinical examination was performed including general examination, local cardiac and chest examinations and laboratory investigations including complete blood picture, liver function tests (SGPT, SGOT, bilirubin, and albumin) and lipid profile were assessed. ECG and conventional Echocardiography to assess left heart dimensions and EF, Trans- mitral ratio flow and the ratio of E-wave to A-wave (E/A) velocities and 2D speckle tracking to assess segmental longitudinal strain of the 17 segments of the left ventricle (Bull's eye).

Echocardiography was performed in the left lateral decubitus position using the use commercial ultrasound VIVID E9 XD clear. The examinations were carried out by two experienced cardiologists. Images were derived from the parasternal and apical positions using the 2D, M-Mode as well as Doppler echocardiography techniques. All echocardiography examinations were carried out regarding to the instructions of the American Society of Echocardiography for the evaluation of LV structures, systolic and diastolic function, and the assessment of the values dependent on the related functions [16].

Trans-mitral flow and E/A ratio were recorded using pulse-wave Doppler with the sample volume placed at the tip of the mitral valve leaflets in the apical 4-chamber view. From the mitral valve inflow velocity curve, the following measurements will be made: peak E-wave velocity (m/s); peak A wave velocity (m/s); and the ratio of E-wave to A-wave (E/A) velocities.

2D speckle tracking strain (2D-STI) analysis for A-Bull's eye (17 segment)

First, attach ECG and get lead II on the screen. Then, 2D speckle tracking for imaging Longitudinal strain were determined using the three standard apical views, as using speckle tracking with a grey-scale frame rate of 50 fps to 85 fps. The LV was divided into 17 segments and Global longitudinal strain (GLS %) in 3 views. After that, Using AFI (automated functional integration) for automatic drawing of ROI (region of interest). Next, Automatic timing of AVC (aortic valve closure). Then, Automatic result (offline) of Bull's eye through the machine. Lastly, Assessment of left ventricular strain including segmental longitudinal strain of left ventricular 17 segments.

Statistical analysis

Data were evaluated with statistical package for social science program (SPSS). The collected data were analyzed in the form number and percentage. The significance for qualitative data was measured by *Chi-square* in order to present the data in the form of mean and standard deviation. The student t test was used for comparison between means of each quantitative data. Significance was considered when *P-value* < 0.05 and high Significance was considered when *P-value* < 0.01.

Ethical statement

A fully informed consent was taken from all patients and controlled. The study was approved by the Institutional Review Board (IRB) of the faculty of medicine Mansoura University. The patients and controls were treated according to the principles of declaration of Helsinki.

RESULT

The Demographic and clinical parameters of the studied patients and controls showed no significant differences as regard age (P=0.15), gender; male (P=0.27) and female (P=0.32) and Body mass index (BMI) (P=0.054).

While comparative analysis between two groups according to laboratory investigation showed significant differences as regarding anaemia and liver functions (P<0.001) (Table1).

Table 1: Shows differences in laboratory findings between two studied groups

Parameters	Groups		*P-value*
	Control (N = 50) (Mean ± Standard deviation)	Hepatitis C patients (N= 50) (Mean ± Standard deviation)	
Hb (g/dl)	13.4 ± 0.735	10.7 ± 0.954	0.001
SGPT (U/l)	24.7 ± 2.78	42.1 ± 3.17	0.000
SGOT (U/l)	24.8 ± 2.1	41.2 ± 4.13	0.000
S.ALB (g/dl)	4.78 ± 0.24	3.66 ± 0.41	0.000
S.BILI (mg/dl)	1.05 ± 0.22	1.95 ± 0.353	0.000
S.cr (mg/dl)	0.954 ± 0.164	0.97 ± 0.173	0.636
INR	0.92 ± 0.133	1.3 ± 0.158	0.000

The data showed that there was no statistically significant difference between hepatitis C group in comparison with control group according to LVEF and LVFS (P= 0.074 and 0.393, respectively) (Table 2). However, there is a significant proportion of patients with chronic hepatitis C who have abnormal LV systolic function (14%) detected by 2DSTE despite having a preserved LVEF (7 out of 50 patients in the current study had abnormal GLS despite a normal LVEF).

Table 2: Comparative analysis regarding different M mode 2 D Echo parameters between two groups (Control group and hepatic patients) shows significant difference in M mode between two group in left atrial dimension (LAD), aortic root diameter (ARD), inter ventricle septum diameter (IVSD), left ventricular end systolic diameter (LVESD), posterior wall thickness in diastole (PW d).

Parameters M Mode	Groups		P-value
	Control (N = 50) (Mean ± Standard deviation)	Hepatitis C patients (N= 50) (Mean ± Standard deviation)	
LAD	3.23 ±0.192	3.62 ± 0.237	0.000
ARD	2.44±0.303	2.99 ± 0.3404	0.000
IVSd	0.91 ± 0.105	1.044 ± 0.125	0.000
LVEDD	4.65 ±0.363	4.67± 0.373	0.848
PWd	0.9 ± 0.109	1.01±0.122	0.000
IVSs	1.32 ±0.142	1.34 ± 0.202	0.665
LVESD	2.89 ± 0.229	3.22 ± 0.486	0.000
PWs	1.28 ± 0.191	1.34 ± 0.151	0.100
LVEF%	67.04 ± 3.25	68.78 ± 5.9	0.074
LVFS%	36.4 ± 2.99	37.22 ± 6.06	0.393

Also, there is high statically significant difference showed between patients and control groups as regard M mode 2 D Echo parameters in left atrial dimension (LAD), aortic root diameter (ARD), interventricle septum diameter (IVSD), left ventricular end systolic diameter (LVESD) and posterior wall thickness in diastole (PW d) (P<0.001) (Table 2)

The comparative analysis between two groups as regarding different Trans mitral Pulsed Doppler parameters between two group (Control group and hepatic patients) showed significant differences in Trans mitral doppler (E wave, A wave, E/A ratio, IVRT and IVCT) between two groups (P<0.000, <0.174, <0.000, 0.006 and <0.000, respectively) as showed in table 3.

Table 3: Shows differences according to E, A waves and ratio in Pulsed Doppler across the mitral valve between two groups.

Parameters Transmitral Pulsed Doppler	Groups		P-value
	Control (N = 50) (Mean ± Standard deviation)	Hepatitis C patients (N= 50) (Mean ± Standard deviation)	
E wave vp	0.839 ± 0.132	0.711 ± 0.170	0.000
A wave vp	0.6104 ± 0.129	0.646 ± 0.129	0.174
E/A ratio	1.405 ± 0.333	1.126 ± 0.321	0.000
IVRT	88.64 ± 5.11	95.38 ± 15.91	0.006
IVCT	65.3 ± 2.42	74.76 ± 15.9	0.000

There are significant differences between two groups in speckle tracking echocardiography as showed in Table 3A, 3B and 3C. The significant difference in the basal segments in anteroseptal PLSS, inferolateral PLSS, inferior PLSS and inferoseptal PLSS was P= 0.012, 0.020, 0.011 and 0.001, respectively (Table 3A).

Table 3A: Comparative analysis between two groups as regarding different 2D speckle tracking basal segments Echo parameters between two groups.

Parameters Basal segments Speckle tracking Echocardiography	Groups		P-value
	Control (N = 50) (Mean ± Standard deviation)	Hepatitis C patients (N= 50) (Mean ± Standard deviation)	
Anteroseptal PLSS	-18.88± 2.89	-16.62 ±5.48	0.012
Anterior PLSS	-19.48 ± 2.88	-18.1 ± 5.36	0.113
Anterolateral PLSS	-18.8 ± 3.01	-18.42 ± 3.97	0.592
Inferolateral PLSS	-19.68 ± 5.73	-17.2 ± 4.71	0.020
Inferior PLSS	-19.22 ± 2.96	-17.4 ± 3.96	0.011
Inferoseptal PLSS	-18.98 ± 3.18	-19.4 ±4.27	0.001

Table 3B showed significant differences in the Mid segments (antero septal PLSS, anterior PLSS, anterolateral PLSS and infer lateral PLSS) P= 0.003, 0.011, 0.002 and <0.001, respectively.

Table 3B: Comparative analysis between two groups regarding different 2D speckle tracking mid segments Echo parameters between two groups

Parameters Mid segments Speckle tracking Echocardiography	Groups		P-value
	Control (N = 50) (Mean ± Standard deviation)	Hepatitis C patients (N= 50) (Mean ± Standard deviation)	
Anteroseptal PLSS	-20.82 ± 2.48	-18.08 ± 5.70	0.003
Anterior PLSS	-21.08 ± 2.55	-18.92 ± 5.30	0.011
Anterolateral PLSS	-21.02 ± 2.79	-18.36 ± 5.18	0.002
Inferolateral PLSS	-21.68 ± 3.17	-18.12 ± 5.31	0.000
Inferior PLSS	-20.28 ±2.77	-19.24 ± 4.42	0.162
Inferoseptal PLSS	-20.46 ± 2.24	-19.16 ± 4.34	0.064

The significant difference in Apical segments in anterior PLSS B, lateral PLSS and Septal PLSS was P= 0.013, 0.001 and 0.031, respectively (Table 3C).

Table 4: Comparative analysis between two groups regarding different 2D speckle tracking apical segments and apex Echo parameters between two groups

Parameters Apical segments & Apex Speckle tracking Echocardiography	Groups		P-value
	Control (N = 50) (Mean ± Standard deviation)	Hepatitis C patients (N= 50) (Mean ± Standard deviation)	
Anteroseptal PLSS	-23.36 ± 4.14	-20.9 ±5.47	0.013
Anterior PLSS	-23.5 ±3.88	-20.1 ± 5.66	0.001
Anterolateral PLSS	-22.66 ± 3.72	-22.52 ±6.20	0.891
Inferolateral PLSS	-23.58 ± 3.68	-21.48 ±5.67	0.031
Inferior PLSS	-23.58 ± 3.68	-21.48± 5.67	0.023
Inferoseptal PLSS	-21.00 ± 1.64	-18.96 ±3.14	0.000

DISCUSSION

Egypt has a greater incidence for HCV than any of its neighboring nations or any other country in the world with a comparable socioeconomic state of affairs and hygienic stipulations [17, 18]. The myocardium may be the goal of numerous types of viral infections. Recently, the importance of hepatitis C virus (HCV) infection has been noted in sufferers with hypertrophic cardiomyopathy, dilated cardiomyopathy, myocarditis and left ventricular (LV) diastolic dysfunction [19, 20]. Significant diastolic dysfunction using trans mitral Doppler imaging and tissue Doppler imaging was detected previously in an Egyptian study was made to assess the cardiovascular effect of HCV on Egyptian patients [21].

Other study have suggested evidence for myocardial injury and left ventricular systolic and diastolic dysfunction in patients with chronic hepatitis C virus [22].

Speckle-tracking echocardiography is a sophisticated new echocardiographic technique that, working with well-known 2-dimensional pictures devoid of the barriers of Doppler techniques, offers a complete analysis of world and regional myocardial deformation evaluated in all spatial directions [10].

The most prominent result of the current study is that a significant proportion of patients with chronic hepatitis C have abnormal LV systolic function detected by 2DSTE despite having a preserved LVEF. Seven of 50 patients (14%) in this investigation had abnormal GLS despite a normal LVEF. These observations suggest that the prevalence of LV systolic dysfunction among patients with chronic hepatitis C may be significantly underestimated using LVEF alone as compared to GLS by 2DSTE.

There is no statistical difference between both sexes in hepatitis C patients in our study. In former studies, there is high rate of HCV infection in males in comparison with female. These differences may be related to the PAT campaigns, as males were more affected by the schistosomiasis burden and hence were main targets of these campaigns. This result of this study agreed with previous work performed in Egypt [23].

There is significant difference between HCV patients receiving treatment and control group, many studies discuss correlation between chronic HCV patients receiving treatment and presence of anaemia [24].

In this study, there is no significant difference between hepatitis C patients and control group as regard lipid profile. On the other hand, other Egyptian studies showed significant hypolipidemia as regard hepatitis C group in comparison with normal group [25].

The finding of the current study showed significant difference between the patient group (hepatitis C patients) and the normal group as regard liver functions and liver cirrhosis detected by ultrasound as was noticed relatively higher levels of ALT, AST, serum bilirubin and low levels in serum albumin levels in hepatitis C group and also there was significant difference between the two group as regard number of cirrhotic patients as we found number of cirrhotic patients are higher in hepatitis C group in comparison to normal group. There is no correlation between the levels of liver enzymes with ultrasound changes and viral titer load as it is not the goal of our research. In previous studies investigated the connection between serum viral titers and the intensity of biochemical and histological abnormalities have produced confused results, some found no correlation between HCV viral loads, and serum ALT values and the extent of histological damage [26] and others proved significant correlation between HCV RNA titers and both serum ALT and level of hepatic Inflammation [27].

In this study there is many significant differences in different echocardiographic parameters either in M mode, Trans mitral pulsed doppler, Tissue Doppler on (septal, lateral) mitral annulus and Speckle tracking longitudinal strain of the 17 segments of the left ventricle.

In this study, there is significant difference between patient and control group as regard left atrial diameter and aortic root diameter. The left atrial dilatation is increased in the patient group in comparison with the control group and this reflect why there is significant number of trivial and mild mitral regurge by colour doppler imaging in hepatitis C group as this can be explained by increase left atrial diameter in hepatitis C group and there is increase in aortic root diameter in patient group.

Regarding to the intra ventricular septal thickness in diastole (IVSd), there is difference between the two groups as it is increased in the patient group. There is increase in left ventricular posterior wall thickness in diastole (PWd) in patient group in comparison with the control group and there is significant difference in left ventricular end systolic diameter (LVESD) in patient group.

Other study confirmed that in HCV patients there are increase in left atrial dimension and cardiac chamber enlargement [28] but this study add the value of correlation between level of inflammation of the liver tissues detected by liver enzymes levels and the level of cardiac camber enlargement and increase in left atrial dimension. There is a study also confirm the increase left atrial diameter in patient group in comparison with the control group [29]. The assessment of the cardiovascular effect of HCV on Egyptian patients was previously investigated in an Egyptian study and had found significant increase in LV wall thickness ''septal & posterior'' wall thickness [21].

In this study, there is significant difference decrease in peak trans-mitral reached in early diastole (E-wave) in hepatitis C group if compared with control group and significant decrease in E/A ratio in the hepatitis C patients when compared with the control group. Another Egyptian study proved significant decrease in Doppler E wave, significant increase in A wave, significant decrease in E/A ratio and reversed E/A ratio diagnosing diastolic dysfunction [21].

It is difficult to diagnose diastolic dysfunction depending on trans mitral flow pulsed Doppler (E/A) ratio only [30]. Tissue Doppler recording of the early diastolic mitral annular velocity (E/A) in connection with the mitral inflow velocity (E) due to its high reproducibility, feasibility and relatively preload-independence and then has become the first line of diastolic evaluation. Myocardial relaxation is impaired in almost all patients with diastolic dysfunction, which is best assessed by the E/A velocity of the mitral annulus using tissue Doppler imaging (TDI). While early diastolic trans-mitral velocity (E) increases progressively as LV filling pressure increases, the mitral annular E/A velocity remains decreased at all stages of diastolic dysfunction [31].

Tissue Doppler imaging E' velocity is a measure of LV relaxation in early diastole and is relatively load independent [32]. E' velocity can be measured from the septal or lateral annulus in the apical four chamber view [33]. However, there is regional variation and E' is higher in the lateral, inferior and posterior basal segments compared to anterior and septal segments. E' velocity correlates inversely with early diastolic pressure (dP/dt) or tau (time constant of LV relaxation) [34]. Thereby reflecting LV relaxation and elastic recoil. In adults, a lateral e' velocity > 12 cm/s represents normal LV diastolic function [35]. And < 8 cm/s indicates impaired LV diastolic function [36]. while a septal e' of > 8 cm/s is considered normal [37].

In this study, there was significant increase in IVCT, IVRT in hepatitis C patients in comparison with control group (*P*= 0,000) and (*P*= 0,005), respectively. There was significant increase in septal E, septal A, lateral A and lateral S tissue Doppler on mitral annulus in hepatitis C patients if compared with control group (*P*= 0.000), (*P*= 0.004), (*P*= 0.006) and (*P*= 0.021), respectively, so no diastolic dysfunction in patient group can be detected in our study depending on this data.

In previous study conducted by Devi *et al*. 2014, the liver inflammation was the more likely for cardiovascular effect of cardiac chamber enlargement and left ventricular diastolic dysfunction so an early diagnosis of chronic HCV infection and timely therapeutic intervention may decrease the associated cardiovascular manifestations [28].

By divide the left ventricle divided into 17 segments (6 basal, 6 mid, 4 apical and the apical segment). As a result regarding longitudinal strain for each 17 segments of LV in longitudinal strain between two group (control and diseased), there were significant difference in many segments either basal segments showed in anteroseptal PLSS, inferolateral PLSS and inferior PLSS, inferoseptal PLSS (*P*= 0.012, 0.02, 0.011 and 0.001 respectively), Mid segments in anteroseptal PLSS, anterior PLSS A and anterolateral PLSS A, infer lateral PLSS A (*P*= 0.003, 0.011, 0.002 and <0.001, respectively) and Apical segments in anterior PLSS B, lateral PLSS and Septal PLSS (*P*= 0.013, 0.001 and 0.031, respectively). Regarding studying the difference in global and regional segmental longitudinal strain, no researches found in chronic HCV patients, as more studies compare GLS of left ventricle as a whole not each segment and in cirrhotic patient mainly alcoholic not in HCV patients [15], so current study is exclusive for detecting segmental longitudinal strain in chronic hepatitis C patients.

Regrading EF and speckle tracking, there is no statistically significant difference between hepatitis C group in comparison with control group according but at the level of regional longitudinal strain there are significant difference in many segments either basal, mid, apical segments, so this study value is that it is the first study to study global and regional longitudinal segmental 2D speckle tracking assessment of the 17 left ventricular segments and to detect sub clinical affection of many left ventricular segments in hepatitis C patients and those patients have no signs of HF and with normal EF by conventional echocardiographic methods so this reflect the value of our study.

2D-STE can be used in hepatitis C patients besides the conventional echocardiographic methods, to detect subclinical myocardial dysfunction in the early stages. A prospective study with a larger patient group is mandatory to prove our findings and to evaluate the diagnostic value of 2D-STE in detecting subclinical myocardial dysfunction in the early stages.

CONCLUSION

The left ventricle systolic dysfunction can be predicted when assessed by global longitudinal strain than by left ventricle ejection fraction in chronic hepatitis C patients. Two-Dimensional Speckle tracking echocardiography can play a pivot role for investigation in this high-risk population to identify patients with subclinical LV systolic dysfunction despite a normal LVEF.

To the best of our knowledge, the present study is the first one that spots the light on the impact of 2DSTE in the evaluation of the left ventricular systolic function in chronic HCV patients. The results of the current work reinforce the influence of continued routine cardiac surveillance for chronic hepatitis C in their long-term care.

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Conflicts of interest

The authors declare no conflict of interest.

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