Research Article

Effect of direct acting antiviral treatment (DAAs), as a new treatment of chronic viral hepatitis C on patients with heart failure.

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Abstract
Introduction: Hepatitis C virus (HCV) infection is a persistent viral infection of the liver and considered as a considerable health dilemma globally especially in Egypt. Treatment for chronic hepatitis C virus infection is evolving from interferon (IFN)-based therapy to direct-acting antiviral (DAA) agents. Cardiovascular diseases (CVDs), which accounted for one-third of global deaths in 2015, are recognized as a major barrier to sustainable human development. **Aim of the work:** The aim of this study is to evaluate the effect of new antiviral treatments regarding heart failure in patients with chronic viral hepatitis "c". **Patients and Methods:** This cohort study was carried out on 100 patients with chronic heart failure and candidate for DAA therapy. Cases were taken and divided into:
Results: The DAAs used in combination regimen with ribavirin do not significantly affect the cardiovascular system.
Key Words: DAA: direct acting antiviral therapy, HCV: hepatitis C virus, CVDs: cardiovascular diseases, CHF: chronic heart failure.

Introduction
Hepatitis C virus (HCV) infection is a persistent viral infection of the liver and considered as a considerable health dilemma globally especially in Egypt[(1)]**.** Treatment for chronic hepatitis C virus infection is evolving from interferon (IFN)-based therapy to direct-acting antiviral (DAA) agents, yet some safety concerns have arisen involving cardiac toxicity. Cardio-vascular diseases (CVDs), which accounted for one-third of global deaths in 2015, are recognized as a major barrier to sustainable human development. Of all CVDs, heart failure (HF) is a global pandemic affecting at least 26 million people worldwide and is increasing in prevalence causing a heavy burden not only on patients and their families but also on society, through enormous use of health care resources[(2)]**.**

Patients and Methods
This cohort study was conducted on 100 patients with CHF and chronic viral hepatitis C. Our patients were taken from cardiology and internal medicine outpatient clinics of Minia University hospital from January 2019 to September 2019. Cases are taken and divided according regimen of DAA therapy into:
Group I: includes 73 patients received dual antiviral therapy (sofosbuvir and daclatasvir).
Group II: It includes 27 patients received triple antiviral therapy (sofosbuvir, daclatasvir and ribavirin).

All studied patients are fully evaluated before and after finishing antiviral treatment.
Exclusion criteria: patients with normal left ventricular ejection fraction(LVEF), patients with acute heart failure, patients receiving amiodarone and patients with chronic viral hepatitis C but not candidate for treatment by DAA therapy.

Inclusion criteria: patients with chronic heart failure and chronic viral hepatitis C who are candidate for treatment by DAA therapy.

The studied groups were subjected to the following:-

- Careful history taking & General and systemic examinations before and after finishing antiviral treatment course.

- ECG: done for all patients before and after antiviral treatment course.
- Echocardiography: done for all patients at base line and at follow up, Ejection fraction (EF) was assessed by M-mode using Teicholz equation and 2D mode by the biplane Simpson method. Evidence of regional wall motion abnormalities (RWMA) was evaluated. Trans mitral flow velocities were recorded using pulsed-wave Doppler[3].

Results

There was no significant alterations in patients' symptoms (shortness of breath, palpitations, and chest pain), signs (heart rate and blood pressure), or ECG recordings (arrhythmias, QT interval, or ST-T wave changes) before and after the treatment.

Also regarding Echocardiography data:

There is no significant difference in EF regarding studied groups before and after treatment (P= 0.06) table (1).

Table (1): Echocardiographic data (before and after antiviral treatment) among studied patients.

	Before	After	p-value
EF	46.91±2.62	45.94±4.22	0.06
EDD (Mean ± SD)	5.3 ± 0.29	5.5 ± 0.34	0.08
ESD (Mean ± SD)	3.0 ± 0.27	3.1 ± 0.35	0.09
E/A ratio (Mean ± SD)	1.38 ± 0.19	1.35 ± 0.19	0.14

On studying the difference in EF regarding both studied group before and after finishing the course of antiviral treatment, there is no significant difference in EF between the studied regimens of treatment before and after finishing the course of antiviral treatment (P= 0.989) table (2).

Table (2): absolute difference between studied groups before and after finishing treatment:

	Group I (n=73)	Group II (n=27)	p-value
EF	-0.55 ± 2.6	-0.56 ± 2.2	0.989
EDD (Mean ± SD)	1.74 ±1.1	1.78 ± 1.1	0.881
ESD (Mean ± SD)	1.84 ±1.08	1.56 ± 1.01	0.245
E/A ratio (Mean ± SD)	0.51 ± 0.2	0.51 ± 0.2	0.412

Difference = after - before

Discussion

In our study, there was no significant alterations in patients' symptoms (shortness of breath, palpitations, orthopnea and chest pain), signs (heart rate and blood pressure), or ECG recordings (arrhythmias, QT interval, or ST-T wave changes) before and after the treatment. This is in agreement with finding of Biomy et al.,[4].

Also there is no significant difference in EF before and after finishing antiviral treatment course, these finding agreed with Mazzitelli et al.,[5], but in a study by Ahmed et al.,[6] showed that treatment with DAA therapy in combinations with ribavirin (RBV), was terminated after young male patient experienced rapidly progressive heart failure and expired. Also 41.2% (14/34) patients had some evidence of cardiac dysfunction (6/14 with EF < 30% and 8/14 from 30 to 50%), this may indicates possible cardiac toxicity of these drugs. other studies by Mehta DA et al.,[7] and Adinolfi LE et al.,[8] showed that the clearance of HCV by

DAAs has a positive impact on pro-atherogenic metabolic factors and appears to indicate that SVR may have an effect in reducing the development of atherosclerosis and cardio-

vascular disease. When studying the statistical difference between the studied regimens (dual (SOV & DCV) and triple (SOV, DCV & RBV) regarding their impact on the myocardium, there was no significant correlations between EF and ribavirin during the treatment course, these finding agreed with Mazzitelli et al.,[(5)].

Conclusion & Recommendations

The clinical observations and experiences from this study demonstrate that different regimens of DAA therapy can be tolerated and effective with minimal side effects observed in patients with chronic heart failure. But we recommend further large and long studies depending on new imaging modalities, cardiac biomarkers and autoimmune markers for better assessment of DAA therapy.

References

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