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ORIGINAL ARTICLE

Assessing Responsiveness of Elevated Serum Ferritin for Treatment in Chronic Hepatitis C Infected Patients

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ABSTRACT

Background: Hepatitis C virus (HCV) infection is a foremost community health issue globally. There is anoptimisticrelationamid iron accumulation in hepatocytes and high serum markers counting transferrin and ferritin. The purpose of this analysis was to examine the responsiveness of the treatment with elevated serum ferritin in patients with hepatitis C infection.

Methods: The study included 200 HCV-infected patients from the department of Medicine, Divisional Headquarters teaching hospital, Mirpurand Isra Medical University, Karachi for six months duration from 16thJune 2020 to 15thDecember 2020. The clinical feature assesses HCV exposure in all patients, biochemical data, and iron status parameters. The results were quantified using Microsoft Excel 2013.

Results: The obtained outcomes indicate that antiviral treatment significantly interferes the iron accumulation in hepatocytes in HCV positive patients. All positive iron values were calculated as 19.93 mol / L; and for all negative PCR, the value was calculated at 24.61 µmol / L prior to drug started. Our patients' levels of iron were 62.77 µmol / L in patients whose PCR is positive for HCV which is within the normal range. Reduced ferritin levels have negative effects after drug administration. The increase in ALT was observed in 37.62% of cases.

Conclusions: Patients with chronic HCV have strong association with serum iron concentration.

Keywords: Ferritin levels, Drugs, Iron load, Hepatitis C Virus Infection, Serum and Liver Cells.

INTRODUCTION

Hepatitis C virus (HCV) infection is a main community health issue globally. The HCV virus incidence in the world is assessed at three percent; of which about 1.70 trillion persons have antibodies to hepatitis C[1-2]. About twenty percent of cases with chronic hepatitis C (CHC)convert into fatal cirrhosis. Additional risk factors related with chronic hepatitis C comprise hepatocellular carcinoma and decompensated liver disease, which eventually require transplantation of liver[3-4]. Various viral factors (e.g., genotypes and basal viral exposure), comorbidities, and genetic history are hosts for the consequences of HCV infection[5-6]. Hepatocytes store about 1/3 of the total iron in the body; therefore, the liver is known to be an important organ for storing iron[7]. The liver synthesizes the major protective ferritin protein and the main transport protein, transferrin; therefore, the liver has an important part in the iron metabolism[7]. Several studies have shown that serum markers of iron (e.g. transferrin, ferritin and iron) and liver iron accumulation have positive relation with CHC[8-9]. However, the diagnosis of cirrhosis of the liver with CHC is important as liver fibrosis is most commonly seen in stages III and IV. Therefore, the risk of hepatic decompensation in patients with advanced liver fibrosis is higher[10].

In the human body, Iron is supposed to be a significant element. Though, the multifaceted relationship amid iron homeostasis and viral infections is serious[11]. The incidence of overload of iron in hepatocytes, its interface with the disease severity, and its influence on treatment response are unclear. Few patients of HCV attain slow constant elimination when receiving advanced HCV treatments[12]. The outcomes of the formerly available literature show positive relation amid accumulation of iron and CHC, which meaningfully complicates the antiviral therapy[13]. Studies have also shown that massive overload of iron is not significant noticed in patients who are infected with HCV. Though, the analysis of cirrhosis in CHC is substantial because at stage III and IV liver fibrosis is frequently detected. Therefore, this study would assist in assessing the response of treatment in patients with CHC infection with high serum ferritin levels.

MATERIAL AND METHODS

This study was held in the department of Medicine, Divisional headquarters Teaching hospital, Mirpur and Isra Medical University, Karachi for six months duration from 16thJune 2020 to 15thDecember 2020. The study looked at the quantitative study and select patients with positive anti-HCV and CHC. The patients were asked to sign the informed consent to include in the study. Ethical approval was also obtained by the Ethical review committee.200 were included as participants. All patients tested positive for HCV antibodies, were detected by real-time viral RNA sequencing PCR. All patients were assessed for clinical features, biochemical data, HCV exposure, and iron status parameters. Patients were evaluated for hepatic iron concentration and matched with age, sex, transmission factor, viremia and alanine aminotransferase (ALT) analyzed by automatic analyzer. All enlisted participants were given the same interferon treatment for accurate results. The most common viral treatment is with Interferon. The t-test of possible samples was cast-off to analyze the

correlation coefficient and p-value. Microsoft Excel 2013 was applied to access the HCV infection prevalence in terms of different nationality and gender.

RESULTS

The outcomes showed a relationship a mid chronic hepatitis C and iron accumulation in liver cells, which meaning fully reserved antiviral therapy. Antiviral therapy can reduce and cure the liver disease risk in patients infected with HCV. Most patients have not undetected viral loads following treatment with interferon. Elimination with HCV viral therapy increases iron removal by phlebotomy. Of the 200 patients with HCV prevalence, men were 30% and women 70%.

Table-1 shows the demographic features of the patients

S.No	No	%age
Males	60	30%
Females	140	70%
Age Range		
20-40	35	17.5%
40-60	102	51%
60-75	63	31.5%

The outcomes of this study show that iron mean value was 18.86 / mol / L before all drugs were administered with positive PCR for HCV; and for all negatives the value was calculated to 25.41 µmol / L (Figure 1).

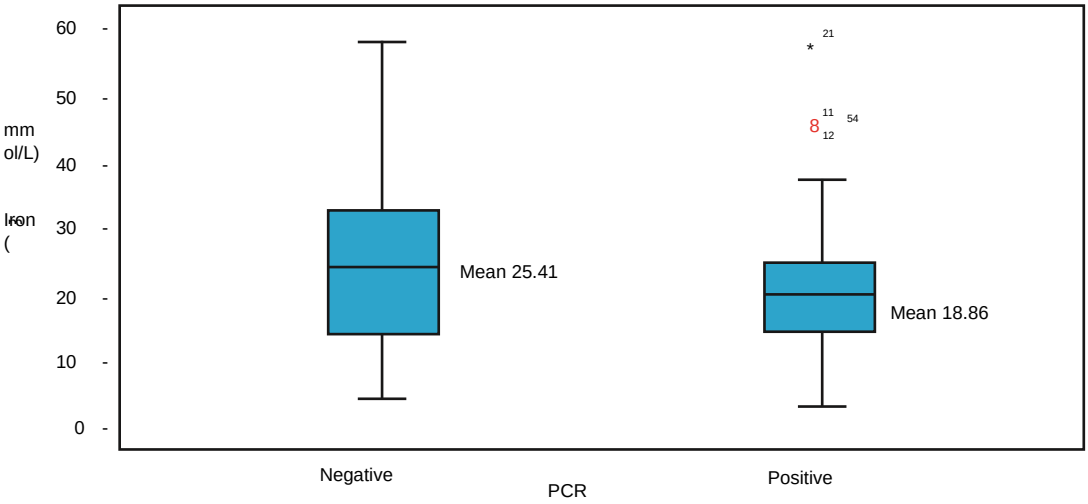

Figure 1: HCV Effect on iron (µmol/L) in negative and positive PCR patients.

These two values were below the standard range of 9 - 31.3 mol / L. Amongstcases with PCR positive, 63.70 mol / L were the observed iron level, which aretypical. Though, all positive patients had 36.66 mol / L of an iron load, which is not according to the standard value. It was estimated that the mean value of ferritin in negative (668.90 mol / L) and positive (909.52 mol / L) is normal in the range of 220-639.40 mol / L (Figure 2).

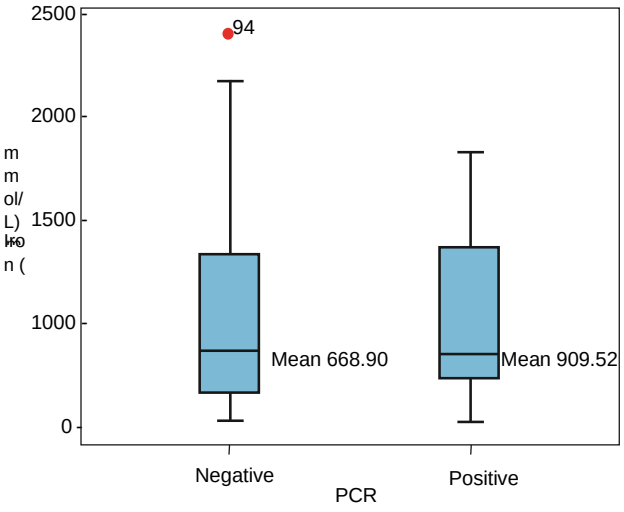

Figure 2: HCV Effect on Ferritin (µmol/L) in negative and positive PCR patients

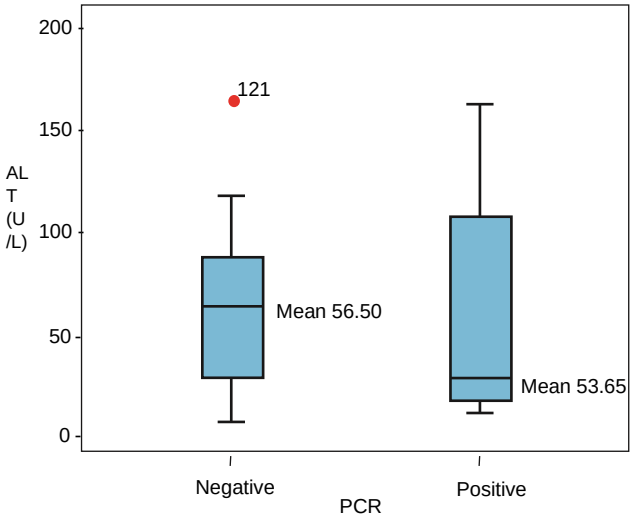

Figure 3: HCV Effect on ALT (ìmol/L) in positive and negative and positive PCR patients

Reduced levels of ferritin have negative effects later to taking drugs. The results also show that 30.61% of participants had normal ferritin levels above standard range and 69.38% had normal ferritin levels, indicating that the PCR was positive.

Table 2: Summary of r- and P values for Ferritin, ALT and Iron after the treatment

Parameters	PCR	Mean	SD	r- value	p-value
Iron (µmol/L)	(Initially/ Positive PCR)	18.86	9.69	0.539	0.001
	(Follow up/ Negative PCR)	25.41	13.01		
Ferritin (µmol/L)	(Intially/ Positive PCR)	909.52	631.2	0.448	0.179
	(Follow up / Negative PCR)	668.9	519.95		
ALT (ìmol/L)	(Initially/ Positive PCR)	53.65	51.03	0.359	0.821
	(Follow up/ Negative PCR)	55.5	32.22		

Table 1 shows the patients who are PCR negatives on follow-up. This is because all positive results come from the period of preliminary analysis and negative results persist after management with therapy. Patients' ALT levels increased to 55.50 µmol / L (PCR positive) from 53.65 µmol / L (PCR negative) after interferon administration (Figure 3). Though, the standard value is in the range of 6-56 µmol / L.

Table-3 shows the values of ALT among positive and negative cases

S. No	No	% Age
Raised ALT Value among HCV cases	121	60.5%
Raised ALT Value among in Normal cases	59	29.5%

Taking ALT levels into account, normal values were among 60.5% of patients with PCR positive; furthermore, the level of ALT increased in over 29.5% of cases. The levels of ALT in PCR negative patients were is the normal range. Table 1 displays the association between iron markers and liver enzymes with primary HCV load and post-treatment.

DISCUSSION

The results show that the incidence of infection with in men is advanced than in women. Most patients receiving interferon therapy as systemic viral intervention have not been diagnosed with viral load[14]. The WHO has provided comprehensive guiding principles for patients, especially those with chronic hepatitis C[15]. Cases of death and disease have been estimated worldwide, and a larger increase has been associated with infection with the HCV. It has been found that about7 million people normally experience fatal complications from HCV-associatedsigns clinically due to hepatocellular carcinoma (HCC) and cirrhosis each year[16]. The World Health Organization has also identified a cure for HCV infection by treatment with antivirals; though, maximum people who are infecteduninformed of the infection because of the disease asymptomatic nature. The WHO also presented preliminary strategies for screening, treating and treating people with hepatitis C in 2014[17]. Several organizations and specialists have developed various medications to treat HCV infection. These therapeutic interventions include a combination of ledipasvir, daclatasvir or paritaprevir, ombitasvir and dasabuvir on the WHO list of key drugs. Such drugs changed HCV treatment and led to the use of regimens[18].Ruhl and Everhart report that nonalcoholic fatty liver disease (NAFL) is at risk for liver damage, ranging from good fat accumulation between hepatocytes to the alcohol-induced steatohepatitis complex. No treatment for cirrhosis of the liver is accurately identified[19]. Research has shown that the liver damage risk is related directly to high iron levels and a decrease in antioxidants, especially carotenoids. Several factors were identified by Thorburn et al that were proposed for the observation variability. These aspects principally include HCV genotype 1B, male gender, excessive alcohol consumption and advanced age at the time of infection[20]. Furthermore, the studies cited that the iron levelsare very vital in chronic infection of HCV. It is known that overload of iron in liver cells promotes liver fibrosis. In addition, a frequent increase in serum iron was observed in CHC patients[21]. In addition, it was reported that the incidence of liver fibrosis increased in HCV infected patients with iron overload, which can be compared with the control having normal iron levels. There is a clear link amid viral load and liver enzymes. A comparable analysis found that severe overload of iron was not related with patients having HCV infection. However, in HCV infected patients, liver iron levels decline[22]. There is a substantialrelationship between the p-value of viral load, which reflects the progress of interferon-mediated viral intervention. Shan et al study shows a strong relationship amid serum iron levels and HCV infection. Exposure to hidden viruses is related with fluctuations in levels of ferritin formerly and later to treatment[23]. Even if the ferritin level has risen before treatment; however, later to treatment, levels of ferritin may decline. It displays the strong link amid HCV and ferritin levels. When taking into account ALT levels, high marginal outcomes were detected before getting treatment; however, insignificant upsurge in ferritin levels was noticed after treatment. Liver enzymes abnormalities and HCV load were not related significantly, Zechini et al has shown a strong link between ALT levels and liver damage[24].

A slight increase in iron levels can cause significant damage when combined with hepatotoxic agents such as chronic viral hepatitis. Serum transferrin and iron levels are measuredself-determining prognosticators of severe necro-inflammatory activity. Iron changes are related to mutations in various genes that are related to our metabolism. The study by Cho et al showed that markers of HCV load and iron metabolism do not have a significant relationship[25]. There is an independent relationship amid progressive liver fibrosis and the upsurge of ferritin and transferrin levels. HCV plays the role of a prognostic guardian in diagnosing patients.

CONCLUSION

The study looked at HCV-positive patients and reassessed them later to successful treatment with interferon. High serum ferritin and iron levels were related significantly with

the disease, leading to progressive liver fibrosis. There are no substantial differences in iron markers in patients with low or high HCV infection. The disease severity can be simply determined by assessing the levels of ferritin and transferrin associated with the progress of necro-inflammatory activity and liver fibrosis. A communal discovery related to HCV infection was iron overload, which is of great importance in its pathophysiology. However, serum ferritin and transferrin levels were not good indicators for detecting liver iron content. There is no indication that liver disease causes the development of cirrhosis and fibrosis of the liver disease. Patients have an increased risk of liver damage in hepatocytes due to chronic HCV. Ferritin levels are greater in patients with chronic HCV; and can be cast-off to diagnose inflammation and liver fibrosis.

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