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ORIGINAL ARTICLE

Assessing Responsiveness of Elevated Serum Ferritin Levels for Treatment in Patients with Chronic Hepatitis C Infection

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ABSTRACT

Background: The infection of HCV is recognized worldwide as an important community health problem. There is an optimistic correlation between accumulation of iron in hepatocytes and amplified serum levels of markers, counting ferritin and transferrin.

Aim: The goal of this study is to determine the response of serum levels of ferritin after the patient's treatment with HCV infection.

Material and methods: The study included 140 HCV-infected patients. All subjects were evaluated for clinical topographies, including HCV viral load, status of serum iron levels and biochemical data. The obtained outcomes were calculated by means of Microsoft Excel 2013.

Results: The results showed that treatment with antiviral drugs interfered significantly the iron deposition in hepatocytes and have association between iron accumulation and HCV treatment. The mean iron value was 20.02 µmol / L for the positive PCR patients; and for a negative PCR reaction, 25.11 µmol / L was the estimated value before treatment. Both values were lower the normal array of 9-31.3 µmol / L. It is estimated that the mean ferritin value for negative PCR (668.55 µmol / L) and positive PCR (913.14 µmol / L) is above normal range which is 221 to 641.35 µmol / L.

Conclusions: Patients with chronic HCV are significantly related to serum iron levels. High levels of iron and ferritin were associated significantly with the disease, resulting progressive fibrosis in the liver. There is no considerable change in serum iron markers among subjects with increased or less severity of HCV infection. The severity of the disease can be evaluated easily by measuring the serum transferrin levels along with ferritin levels, which are linked with the progression of fibrosis of the liver and necro-inflammatory activity.

Keywords: levels of serum ferritin; iron load; drug; liver cells and HCV infection.

INTRODUCTION

The infection of HCV is recognized worldwide as an important community health problem. HCV prevalence is estimated at 3% worldwide; Of these, around 17 trillion people are affected by HCV[1-2]. About twenty percent of chronic HCV patients progress into liver cirrhosis, a serious and life-endangering liver disease[3-4]. Additional CHC causing risk factors are HCC and decompensated disease of the liver which ultimately entail a liver transplant[5]. Numerous viral factors (like initial viral load and genotype), host genetic background and comorbidities depict the consequences of HCV infection. Hepatocytes are accountable for the storage of about 1/3rd of the body's overall iron; So, for iron storage; liver is supposed to be a vital organ[6]. Ferritin, the chief storage protein, and transferrin, the most important carrier protein, are produced in the liver; so, it has a vital part in the iron metabolism[7-8]. Various researches have reported a positive association between elevated serum markers of iron (like ferritin, transferrin and iron) in CHC patients and hepatic iron deposition[9]. Though, the assessment of liver cirrhosis in CHC is important as fibrosis of liver is often realized in stages 3 and 4. So, patients with progressive liver fibrosis are at amplified danger of liver decompensation.

Problem Statement: Iron is an essential human body element. Though, the key issue is the complex relationship between viral infections and iron homeostasis[10]. The incidence of hepatic iron overload, its interference with progression of the disease, and its effect on the response after treatment are still uncertain. Some HCV patients achieve consistent HCV clearance during advanced therapy. The results from the previously published literature showed an association between iron build-up in liver cells and CHC, which suggestively influenced the anti-viral treatment[11]. Likewise, one study showed that iron overload was not correlated significantly with patients of HCV. Most patients affected by HCV infection have reduced iron levels in the liver[12]. So, this research will aid in measuring the response of serum levels of ferritin after the patient's treatment with HCV infection.

MATERIALS AND METHODS

The study included quantitative analyses and recruitment of subjects with positive anti-HCV antibody and CHC infection. Informed consent was attained from all volunteers. The study obtained ethical approval before the start of study. The study included 140 HCV-infected patients. All volunteers tested anti-HCV antibodies positive identified by the microparticle chemiluminescent test and established by real-time PCR for viral RNA. All cases were evaluated for HCV viral load, clinical features, iron status parameters and biochemical data. Hepatic concentration of iron was assessed and associated with gender, age, alanine aminotransferase (ALT) and transmission risk factor, viremia. The automatic analyser was used to ALT levels. All enlisted cases were given the similar treatments to achieve exact outcomes. Anti-viral therapy is a communal viral treatment now-a-day. The p-value was calculated with Paired samples t-test and the correlation coefficient. The obtained outcomes were calculated by means of Microsoft Excel 2013 to analyse HCV infection pervasiveness among people of different genders and nationalities.

RESULTS

In 140 patients, 27.9% of HCV cases were female and 72.1% were male. Results showed a relationship between iron accretion in cells of the liver and CHC, which suggestively interfered with antiviral treatment. Antiviral treatment is expected to improve and decrease the jeopardy of progressing towards liver disease in patients with HCV. The probability of eradicating HCV with antiviral therapy augmented iron removal by phlebotomy.

The mean iron value was 20.02 µmol / L for the positive PCR patients; and for a negative PCR reaction, 25.11 µmol / L was the estimated value before treatment. It is estimated that the mean ferritin value for negative PCR (668.55 µmol / L) and positive PCR (913.14 µmol / L) is above normal range which is 221 to 641.35 µmol / L. Table 1 showed a negative PCR reaction on follow-up visits. It was observed that ALT levels among patients increased from 54 µmol / L (PCR negative) to 57.52 µmol / L (PCR positive) later to getting treatment. Though, the standard value is 6-56 µmol

/ L. Taking into account ALT levels, 65.70% cases have normal range with PCR positive; also 34.30% of the cases had elevated ALT levels above the normal range. In PCR negative subjects, ALT levels were halved in 48.80% of cases and were within standard limits. Table-II presents the relationship between enzymes of the liver and markers of serum iron with baseline load of HCV and afterwards HCV treatment.

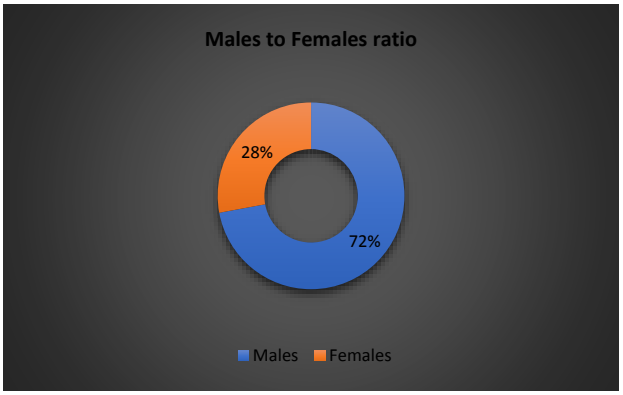

Figure 1:

Table-1: shows the age range of patients

Age range	
18-30	35(25%)
30-45	65(46.4%)
45-60	40(28.6%)

The drop in ferritin levels was an adverse effect after treatment. The study further exhibited that 30.17% of the subjects had levels of ferritin greater than normal value, and 69.04% of people had levels of ferritin within the standard value, which shows positive PCR.

Table 2: shows R-values and p-values for ALT, Iron and Ferritin afterwards the treatment

Parameters	PCR	Mean	S. D	Value of R	Value of P
Ferritin (µmol/L)	(Primarily PCR Positive)	913.14	628.82	0.441	0.179
	(Negative PCR on Follow up)	668.55	519.31		
Iron (µmol/L)	(Initially PCR Positive)	20.02	8.93	0.539	0.001
	(Negative PCR on Follow up)	25.11	13.17		
ALT (imol/L)	(Initially PCR Positive)	57.52	49.48	0.370	0.808
	(Negative PCR on Follow up)	54.00	31.19		

DISCUSSION

The results showed that the frequency of HCV in males was progressive than in females. Viral loads have not been detected in the majority of patients receiving interferon therapy as a common viral intervention according to Nagral A et al study[13]. The WHO has developed comprehensive guidelines mainly for CHC patients. It is estimated that the number of morbid and fatal cases of HCV is increasing worldwide. It is established that about seven lac people annually face complications, often life-threatening, from HCV-associated symptoms that include clinically hepatocellular carcinoma and cirrhosis as shown in Su CW et al study. The WHO has also established that infection of HCV can be treated with antiviral therapy; though, because of the disease asymptomatic nature, maximum people who had infection are uninformed that they are infected as given in Gămăn AE et al study[14]. The WHO also published the 1st strategies for the detection, treatment and care of people infected with HCV in 2014[15]. Various specialists and organizations have introduced numerous medicines for the HCV treatment. According to the study by Çam H and Mehrez MI et al; amongst these beneficial treatments, daclatasvir, ledipasvir or amalgamation of ombitasvir, dasabuvir and paritaprevir were added to the WHO Essential Medicines List[16-17]. Such drugs changed HCV treatment to allow regimens to be used. In summary, these WHO guidelines intended to deliver several endorsements grounded on past and recent researches for the development of new treatment plans for HCV infection[18]. The strategies mainly included combinations of oral new drugs, often known as direct-acting antivirals (DAA). The plans also included some commendations for ideal treatment regimes grounded on the patient's clinical history and genotype. Ruhl and Everhart defined that non-alcoholic steatohepatitis generally includes the danger of liver damage, which can range from mild fat accumulation between hepatocytes to complex non-alcoholic steatohepatitis that can progress towards the cirrhosis and liver failure[19].

Thorburn et al recognized various aspects suggested for the observed variability. Factors were primarily HCV 1b genotype, males, heavy alcohol consumption and progressive age of infection[20]. Furthermore, the study revealed the part of iron in chronic HCV infection is very important. In liver cells; iron overload is believed to promote liver fibrosis. In addition, it has been observed that serum iron is often elevated in patients with chronic HCV. It has also been assessed those reports of an increased rate of liver fibrosis in patients having HCV-infection with iron stained in comparison to controls without noticeable liver iron have been assessed[21]. If they don't return to the normal range, liver enzymes are probable to decline later to the treatment. In the present study, parameters such as ferritin, ALT, iron rises in most patients of HCV later to treatment as the liver may not have recovered[22].

A minor rise in levels of serum iron when collective with hepatotoxic agents like chronic viral hepatitis result in serious deleterious effects[23]. The transferrin and serum iron levels are supposed to be autonomous forecasters of severe activity of necro-inflammation. The changes in serum iron are associated with transmutations in various genes connected to iron metabolism. A Cho et al study presented that iron metabolism markers were not significantly associated with HCV viremia. There is an autonomous relationship amid the advanced liver fibrosis development and the levels of ferritin and transferrin in Sajjad SF et al study[24]. They serve as prognostic indicators for the diagnosis of HCV patients.

CONCLUSION

High levels of iron and ferritin were associated significantly with the disease, resulting progressive fibrosis in the liver. There is no considerable change in serum iron markers among subjects with increased or less severity of HCV infection. The severity of the disease can be evaluated simply by measuring the serum transferrin levels along with ferritin levels, which are linked with the progression of fibrosis of the liver and necro-inflammatory activity.

In HCV affected patients; overload of iron have and an important role in its pathophysiology. Though, transferrin and ferritin serum levels have not been found to be upright pointers for analyzing liver content of iron. There is no proof that iron from the liver affects the liver disease progression leading to fibrosis and cirrhosis. Patients may have liver injury because of chronic HCV in hepatocytes. Ferritin levels are generally greater in chronic HCV patients and can be evaluated to assess the degrees of inflammation and diagnosis of liver fibrosis.

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