CORRELATION OF SERUM ALANINE AMINO TRANSFERASE WITH VIRAL LOAD IN CHRONIC HEPATITIS C PATIENTS

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Abstract

Objective: To determine the correlation of serum alanine amino transferase with viral load in chronic hepatitis C patients.

Material & Methods: 114 patients were included in this study that fulfilled the criteria of diagnosis of chronic hepatitis C i.e. raised serum ALT and positive anti HCV antibodies by ELISA.

Results: Out of 114 patients included in the study 58(50.9%) were males and 56(49.1%) were females. The mean age was 34.61±11.35 years. The mean serum alanine amino transferase (ALT) level was found to be 61.39±40.59 and viral load found to be 115000±12970. The correlation coefficient "r" between serum alanine transaminase and viral load was found to be .035 which is less than the predicted i.e. 1.

Conclusion: No significant correlation was found between the serum alanine amino transferase and viral load in chronic Hepatitis C patients

Key words: Serum ALT, Viral Load , chronic hepatitis C.

INTRODUCTION

Hepatitis C virus infection is a major cause of chronic liver disease, frequently progressing to end stage liver disease, cirrhosis and increased risk of hepatocellular carcinoma[1]. The effects of HCV infection has a broad range extending from asymptomatic chronic infection, having normal liver functions, to chronic hepatitis, eventually leading to cirrhosis and hepatocellular carcinoma[2].

Pakistan is included in the list of the countries that carries world's highest burdens of chronic hepatitis and mortality due to cirrhosis and hepatocellular carcinomas. In Pakistan the prevalence of hepatitis C antibody among healthy adults is found to be 3.0%[3].

Chronic hepatitis C is often silent, most of the times diagnosed only by routine serologic or biochemical testing[1]. Evaluation and diagnosis of HCV infections can be done through biochemical, virological, and histological examinations[2]. Serum Alanine Amino Transferase (ALT) is the test used most frequently utilized for routine screening in evaluation of liver damage[4].

Liver biopsy is the gold standard for determination of activity and staging of fibrosis. However, this procedure has some limitations which include the risk of pain or bleeding, inaccurate staging from sampling error, and variability of biopsy interpretation. With the increase in availability of laboratory blood tests, the use of diagnostic liver biopsy is on the decline. "The drawbacks of the liver biopsy have prompted researchers to investigate other noninvasive markers for the determination of the severity of liver disease.[5]

In those individuals who have chronic hepatitis C, relationship between viral load and raised serum ALT levels may have clinical significance[1]. The rationale of this study is to determine if any correlation exists between the viral load on quantitative PCR and serum ALT in chronic Hepatitis C patients so that it can be used to determine the degree of liver damage in place of liver biopsy which has some inherent limitations like pain or risk of bleeding, sampling error, and variability of biopsy interpretation.

MATERIALS AND METHODS

Study has been conducted at the department of Medicine, Hayatabad Medical Complex, Peshawar from 5-5-2017 to 15-11-2017. The study was done through a Consecutive non-probability sampling. Inclusion Criteria was to induct all patients of ages from 15 to 60 years. These were treatment naïve patients positive for antibodies to hepatitis C virus by ELISA for more than six months duration. Patients with de-compensated liver disease, acute hepatitis and hepatitis other than hepatitis C or concomitant B & C infections were excluded from the study.

This study was conducted after approval from hospital ethical and research committee. All patients fulfilling the inclusion criteria were included in the study. The diagnoses of chronic hepatitis C patients was based on detection of anti-HCV antibodies on ELISA and duration of more than 6 months. The purpose and benefits of study was explained to the patients and a written informed consent was obtained.

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Serum ALT measured by an automatic analyzer, assessment of HCV RNA quantitatively (Viral Load) by polymerase chain reaction in real time technique. All these tests were done under the supervision of a pathologist/microbiologist who is the fellow of CPSP and has more than 10 years experience in chemical pathology.

All the above mentioned information including name, age, gender and address were recorded in the study proforma. Strict exclusion criteria were followed to control confounder.

Data was analyzed in SPSS version 16.

Mean + standard deviation were evaluated for quantitative variables like age, viral load and ALT. Frequency and percentage were calculated for qualitative measure like gender.

Correlation coefficient was calculated between the ALT and viral load by applying Pearson's correlation test while keeping P value of < 0.05 as significant. Viral load was stratified among the age and gender to see the effect modifiers.

RESULTS

Our study included 114 patients with chronic hepatitis C. The mean age was 34.61±11.35 years with the youngest patient of 14 years while the eldest one of 59 years. There were 58 (50.9%) males and 56 (49.1%) females participating in this study. The demographic characteristics are given in table 1 & 2.

The serum ALT level was found to be 61.39±40.595 with the minimum value of 16 IU/l and maximum value of 200 IU/l. The mean viral load was found to be 115000±12970 with the minimum value of 2000 copies/ml and maximum value of 962226copies/ml. The Age and gender distribution wise values of serum ALT is given in Table 3 &4:

Serum alanine transaminase levels were correlated with viral load which showed the following results in which the correlation coefficient "r" between serum ALT and viral load was found to be .035 which was less than the predicted i.e. 1, showing that no significant correlation exists between serum alanine transaminase levels and viral load as depicted in Table 5.

DISCUSSION

Chronic hepatitis C is defined as an infection with hepatitis C virus lasting for more than 6 months based on the presence of HCV RNA.6 Chronic infections mostly remains asymptomatic during the first few decades,6 and are most commonly diagnosed following the investigation of raised liver enzyme levels or during a routine screening of individuals at high risk for hepatitis. Routine tests are not able to differentiate between acute and chronic infections.[7] Liver biopsies are used for the determination of the extent of liver damage present; however, this procedure has some inherent risks.[8]

Table 1:

Age	Frequency	Percent
<20	16	14.0
21-35	45	39.5
36-50	42	36.8
51+	11	9.6
Total	114	100

Table 2:

Gender	Frequency	Percent
Male	58	50.9
Female	56	49.1
Total	114	100

Table 3:

			Viral Load			Total
			<10000	10000-60000	60001+	
Age of Patient (in years)	<20	Count	3	2	11	16
		%within Age of the patient (in years)	18.8%	12.5%	68.8%	100%
	21-35	Count	5	10	30	45
		%within Age of the patient (in years)	11.1%	22.2%	66.7%	100%
	36-50	Count	13	4	25	42
		%within Age of the patient (in years)	31.0%	9.5%	59.5%	100%
	51+	Count	1	2	8	11
		%within Age of the patient (in years)	9.1%	18.2%	72.7%	100%
Total		Count	22	18	74	114
		% of Total Patients	19.3%	15.8%	64.9%	100%

Table 4:

Viral load Gender of patient Crosstabulation					
			Gender of the patient		Total
			F	M	
Viral Load	<10000	Count	14	8	22
		% within Viral load	63.6%	36.4%	100.0%
	10001 – 60000	Count	8	10	18
		% within Viral load	44.4%	55.6%	100.0%
	60001+	Count	34	40	74
		% within Viral load	45.9%	54.1%	100.0%
Total		Count	56	58	114
		% of Total Patients	49.1%	50.9%	100.0%

Table 5:

		Serum ALT	Viral Load
Serum ALT	Pearson Correlation	**1**	0.035
	Sig. (2-tailed)		0.716
Viral Load	Pearson Correlation	0.035	1
	Sig. (2-tailed)	0.716	
List wise N=114			

There are variable blood tests available for the determination of the degree of liver fibrosis and alleviate the need for liver biopsy.[8]

Liver biopsy with its histopathological evaluation is considered to be the gold standard but liver biopsy is an invasive procedure. It can cause mild complications like pain and bleeding but severe complications like pneumothorax and severe intra abdominal infection have generated the need to develop simple and non invasive tests which can predict the degree of liver damage. These tests like serum ALT and viral load can be used as alternate tests for liver biopsy.[9,10]

In patients with chronic hepatitis C, relationship between Quantitative HCV RNA and elevated serum alanine transaminase levels may have clinical significance. Our study was to determine if any correlation exists between the Viral load and serum ALT in chronic Hepatitis C patients so that it can be used to determine the degree of liver damage instead of liver biopsy.

Our study included 114 patients with chronic hepatitis C infection. Serum Alanine Transaminase and Viral Load was done in all these patients and it was determined if there exists any correlation between them.

Several studies regarding the correlation of viral load and serum ALT level in patients with chronic hepitis C were done but the conclusions were different.

In this study, the Viral Load i.e. serum HCV-RNA titer has no significant relationship with ALT level (r=0.035).This result is in keeping with the findings of the study done by Pei Liu and colleagues which showed no significant correlation between serum HCV RNA titer and ALT level with correlation coefficient 'r' value of 0.40[2].

CONCLUSION

In our study the correlation coefficient "r" between serum alanine transaminase and viral load was found to be .035 which is less than the predicted value i.e 1, showing that no significant correlation exists between serum Alanine Amino Transferase and Quantitative HCV RNA in chronic hepatitis C patients.

Our study concluded that the correlation between serum Alanine Amino Transferase and viral load was not significant so serum Alanine Amino Transferase cannot replace Liver Biopsy as an investigation to be used to determine the severity of liver damage or stage of fibrosis in patients with chronic hepatitis C infection.

Liver Biopsy is the Gold standard for determination of the activity and staging of fibrosis in chronic hepatitis C patients.

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