Serum Alanine Aminotransferase Levels in Hepatitis C Patients in Teaching Hospitals of Peshawar

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Summary: Alanine Aminotransferase (ALT) is supposed to be the most important indicator of hepatitis. The present study was undertaken to find correlation between ALT and HCV, to establish an optimum level of serum ALT in HCV positive patients and to explore the possibility of using serum ALT activity as an important indicator for HCV screening. The study was conducted on 180 known hepatitis C positive patients and compared with the control group. The patients were taken from Khyber Teaching Hospital, Lady Reading Hospital, Post Graduate Medical Institute (PGMI) Hayatabad Medical Complex and matching controls from local community of Peshawar. The patients were divided into three main groups as symptomatic, asymptomatic and cirrhotic HCV patients. A strong correlation was found between elevated ALT and HCV infection. 78.66 % of symptomatic, 82.66 % of asymptomatic and 80 % of cirrhotic HCV patients were found to have elevated ALT values when compared with the control group. Mean ALT level in the three patient groups was 82.66 U/ l, indicating that a mild elevation in the ALT values may be considered as a signal for the presence of HCV antibodies.

Introduction

Alanine Aminotransferase, formerly called Glutamic Pyruvic Transaminase (GPT) is the most important representative of a group of enzymes, the aminotransferases or transaminases, which catalyze the conversion of α-keto acids into amino acids by transfer of amino group. Alanine Aminotransferase (ALT) is produced in the hepatocytes, the major cell type in the liver. ALT is found primarily in liver and kidney, with lesser amounts in heart and skeletal muscle. It is a specific indicator of cell damage in hepatitis. When such damage occurs, ALT is released from the liver cells into the blood stream, often before jaundice appears, resulting in abnormally high serum levels. As a liver specific enzyme ALT is only significantly elevated in hepatobiliary diseases. Different viruses may cause viral hepatitis. These include both DNA and RNA viruses. Hepatitis A, E and G cause only acute hepatitis and pose only a short-term risk. In contrast, hepatitis B and hepatitis C may cause chronic infections [1-5].

The Hepatitis C virus (HCV) infection is prevalent worldwide. The WHO estimates that 170 million peoples (3 % of world population) are infected with Hepatitis C virus and the prevalence of 0.5 % to greater than 10 % has been found in population samples around the world [6-7]. A high HCV prevalence of 18.5 % is reported from Egypt [8], of whom 63.4 % had chronic HCV infection. In studies of risk factors among patients presenting with acute and chronic hepatitis C, a history of intravenous drug use is the most common finding. In Damascus, Syria, a prevalence (60.5 %) of hepatitis C virus antibodies among injection drug users (IDUs) is reported [9]. A study conducted in two urban areas of Pakistan [10] on high-risk groups of IDUs, reports HCV seroprevalence as 88 %. The HCV prevalence was 86 % among IDUs in northern Thailand [11]. A study from Georgia [12] among IDUs reports 68.8 % seropositive for HCV, 55.2 % for HBV and 10 (1.7 %) for HIV.

HCV gives both acute and chronic hepatitis C. Progression of disease is unpredictable, typically slow and evolves over decades. Since it usually progress slowly over many years, most people who are infected with hepatitis C are not aware of noticeable symptoms for a long time. Most of the patients will not be diagnosed until they

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present years later with complications of chronic liver disease. Jaundice develops in less than 30 % of the patients is mild and self limiting. At least 60-80 % of the patients develop chronic liver diseases. Approximately 10-20 % of persons infected with hepatitis C develop cirrhosis of the liver within 20 years, which can lead to liver failure and death. Among those who develop cirrhosis, about 1-5 % will develop hepatocellular carcinoma [6-13].

Correlation between HCV infection and ALT has extensively been studied by different workers [14-18]. In studies, followed for a period of upto one year, an estimated 30-50 % of patients with chronic HCV infection have persistently normal ALT, in contrast to a study followed for a longer period of ten years has reported only 6 % of persons with chronic HCV had persistently normal ALT levels [14].

The present study was under taken to find correlation between ALT and HCV infection, to establish an optimum level of serum ALT in HCV positive patients and to explore the possibility of using serum ALT activity as an important indicator for HCV screening.

Results and Discussion

During the present study a total of 255 blood samples were analyzed. Among 255 samples, 75 were normal healthy individuals taken as controls, 75 were asymptomatic hepatitis C patients, 75 were symptomatic hepatitis C patients and 30 were cirrhotic patients due to hepatitis C.

The age of the individuals ranged between 15 to 65 years. Out of 75 normal controls there were 25 females and 50 males. Out of 180 HCV patients there were 121 male and 59 female patients. The mean age of controls, symptomatic asymptomatic and cirrhotic patients was 31.72, 28.85, 32.87 and 54.06 years respectively. The distribution of subjects on the basis of age and sex has been shown in Table-1.

Fig 1 shows the percentage of patients with elevated ALT values. 78.66 % of symptomatic, 82.66 % of asymptomatic and 80 % of cirrhotic HCV patients have elevated ALT values when compared to control. This means that almost all the HCV patient groups have approximately the same percentage of patients having elevated ALT values.

Table-1: Age and gender wise distribution of control and HCV positive subjects.

S. No.	Group	Age Mean (years)	Male No.	Male %	Female No	Female %
1	Controls	31.72	50	66.66	25	33.33
2	Asymptomatic Patients	32.86	49	65.33	26	34.66
3	Symptomatic Patients	28.85	50	66.66	25	33.33
4	Cirrhotic Patients	54.06	22	73.33	8	22.66

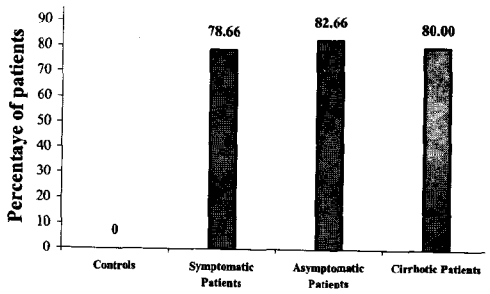

Fig. 1: Percentage of patients with elevated ALT values in different HCV patient and control groups.

Gender wise distribution of mean ALT values in different groups of HCV positive patients is shown in Table-2. Mean ALT values of Symptomatic and asymptomatic male patients are higher than the female subjects, while in cirrhotic patients the situation is reverse and female have higher mean ALT values as compared to males.

Table-2: Gender wise distribution of mean ALT (U/ l) values in different groups of HCV positive patients.

Patient Groups	Male	Female
Symptomatic	105.00	74.10
Asymptomatic	83.00	77.10
Cirrhotic	51.50	75.13

Table-3 show the age wise distribution of patients with elevated ALT values in different HCV patient groups. Majority of symptomatic and asymptomatic patients having elevated ALT values were lying in the age group of 26-35 years, while all the cirrhotic HCV patients were present in the age group 46-55 and 56-65 years. No cirrhotic patient was found below the age of 45 years.

Table- 3: Age wise distribution of patients with elevated ALT values in different HCV patient group.

Age group (years)	Symptomatic patients		Asymptomatic patients		Cirrhotic patients	
	No.	%	No.	%	No.	%
15 - 25	14/ 18	77.8	18/22	81.8	0	0
26 - 35	24/ 30	80	35/41	85.3	0	0
36 - 45	15/ 21	71.4	10/12	83.3	0	0
46 - 55	5/ 5	100	0	0	14/17	82.3
56 - 65	1/ 1	100	0	0	10/13	76.9

Table- 4: Range of ALT in symptomatic, asymptomatic and cirrhotic HCV patients.

S. No.	ALT levels	Symptomatic Patients (n=75)		Asymptomatic Patients (n=75)		Cirrhotic Patients (n=30)	
		No.	%	No.	%	No.	%
1	41 - 80 U/ l	18	24	32	42.7	18	60
2	81 - 120 U/ l	23	30.7	20	26.7	6	20
3	121 - 160 U/ l	7	9.3	6	8	0	0
4	161 - 200 U/ l	3	4	2	2.7	0	0
5	201 - 240 U/ l	6	8	1	1.3	0	0
6	241- 280 U/ l	2	2.7	1	1.3	0	0

Table-4 shows the level of ALT in different HCV patient groups. 24 % of symptomatic, 42.7 % of asymptomatic and 60 % of the cirrhotic patients were having ALT value in the range of 41-80 U/ l. A high number (30.7 %) of symptomatic patients have ALT level in the range of 81-120 U/ l. This means that majority of the cirrhotic and asymptomatic HCV patients have the ALT values in the range of 41-120 U/ l. The highest level of ALT found in symptomatic, asymptomatic and cirrhotic patients was 280, 253 and 115 U/ l respectively. This shows that symptomatic HCV patients have higher ALT levels as compared to asymptomatic and cirrhotic patients.

Mean ALT values of control and different HCV patient groups is represented in Fig. 2. Statistical analysis revealed that the levels of ALT values in symptomatic patients is higher than asymptomatic patients at the level of $P < 0.05$.

ALT measurements are used to manage HCV infected individuals. In the present study, ALT is found to be an important indicator of HCV infection. ALT has been observed to be elevated in 78.66 % symptomatic, 82.66 % in asymptomatic and 80 % in cirrhotic HCV patients as compared to controls. This showed that there is a close correlation between elevation in ALT and HCV

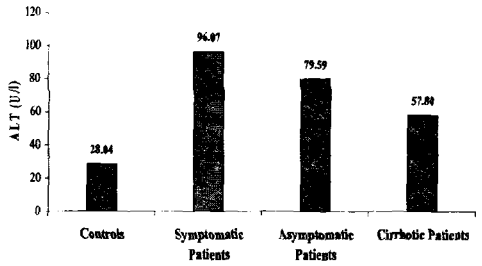

Fig. 2: Mean ALT values of Control and different HCV patient groups (Reference value: Male: 9-43 U/ l Female: 9-36 U/ l)

infection. This pattern of present study is strongly supported by the work of Wang [19], Rodger [20], Chang [21].

Wang *et al.*, studied a sample of 6095 residents in a community health survey in a small township of Southern Taiwan, Republic of China. The authors found that an elevated serum ALT in a community is a strong indicator of prevalence of anti HCV antibodies.

Rodger etal studied 98 anti HCV positive individuals and found that 69 % of the HCV infected persons have elevated ALT values. A study conducted in Taiwan by Chang *et al.*, shows a close relationship in HCV infection and elevated ALT. According to the authors, ALT screening still remains a simple and valuable method in the early recognition of HCV infection.

Our study shows that in all the three patient groups mean ALT value was not more than 82.66 U/ l. Our findings are in accordance to the study reported by Zahoor *et al.*, [22]. The study was based on 425 hospitalized subjects, who were either clinically jaundiced or suspected for jaundice and were referred for investigations to PMRC labs. Results have revealed that 24 % of the jaundiced and 20.4% of the suspected group were positive for HCV antibodies. Mean ALT values were 60 and 78 U/ l in the Jaundiced and suspected HCV positive groups, which was highly significant at the level of 0.001 when compared with Jaundiced and suspected HCV negative groups. Thus a mild elevation in the ALT values may be considered as a signal for the presence of HCV antibodies.

Experimental

For this study four groups were selected. One group was consisted of normal healthy individuals of both sexes screened negative for hepatitis C virus. The patient groups included symptomatic HCV patients, asymptomatic HCV patients and diagnosed/hospitalized cirrhotic HCV patients. These patients were taken from Khyber Teaching Hospital (KTH) Pakistan, Lady Reading Hospital (LRH) Pakistan, Post Graduate Medical Institute (PGMI) Hayatabad Medical Complex Pakistan and matching controls from local community of Peshawar Pakistan after taken informed consent. The symptomatic and asymptomatic patients were categorized on the basis of verbal information's from the patients and recorded on standard questionnaire.

The blood was collected from each patient and control group after taking informed consent. Serum ALT was measured on Microlab-200 by using Merck kit. The study was conducted in the labs of PMRC Research Centre, Khyber Medical College, Peshawar Pakistan.

Conclusions

In the present study, ALT showed a close correlation with HCV. ALT levels are mildly elevated in up to 80 % of HCV patients. It is recommended that if general screening for HCV is not possible at some places, at least ALT should first be checked and a mild elevation of ALT should be taken as a base for HCV screening.

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