

# Frequency of Hepatitis C Virus Infection and Estimation of Serum Alanine Aminotransferase in HCV Positive Patients

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## Abstract

**Background:** Hepatitis C virus (HCV) has emerged as a leading cause of chronic hepatitis, liver cirrhosis and hepatocellular carcinoma worldwide. Hepatitis C is rapidly emerging as a major health problem in developing countries including Pakistan. Serum Alanine Aminotransferase (ALT) is the most frequently utilized screening test in routine evaluation of liver damage. This study was conducted to determine the seroprevalence of hepatitis C virus infection and its association with serum alanine aminotransferase.

**Objective:** Determination of the seroprevalence of hepatitis C virus infection and its association with serum alanine aminotransferase in patients at social security hospital, Islamabad.

**Material and Methods:** A cross sectional study was conducted at clinical laboratory of social security hospital Islamabad, from May 2009 to October 2009. All samples referred to social security hospital for hepatitis profile were included in the study. All patients were screened serologically for hepatitis C virus antibodies and serum alanine aminotransferase was determined in selected HCV positive patients only.

**Results:** Out of 1006 blood samples 146 were positive for anti-HCV antibodies with an overall positivity of 14.5%. Out of these 55% cases were males and 45% were females. Seroprevalence of HCV was found to be 8% in the age group of <20 years, and almost equal i.e. 46% and 49% in 20-40 years and >40 years age groups respectively. Serum ALT was determined in total 83 patients only: they showed levels less than 30U/L in 25% patients, 30-45U/L in 15% patients, 46-60U/L in 19% patients, 61-100U/L in 29% patients and more than 100U/L in 12% patients.

**Conclusion:** The present study revealed that prevalence of HCV was 14.5% and ALT levels were found to be more than 45U/L in 75% of the anti HCV positive cases, showing the significance of this biochemical marker as diagnostic tool in such patients.

## Introduction

Hepatitis C is rapidly emerging as a major health problem in developing countries including Pakistan.<sup>1-5</sup> It is estimated that 3-4 million people are infected with HCV each year. Some 130-170 million people are chronically infected with HCV and at risk of developing liver cirrhosis and/or liver cancer. More than 350,000 people die from HCV-related liver diseases each year. Countries with high rates of chronic infection are Egypt (22%), Pakistan (4.8%) and China (3.2%).<sup>6</sup> In Pakistan 10 million people are presumed to be infected with HCV.<sup>7, 8</sup> Seroprevalence studies of anti-HCV antibodies in the general population of Pakistan have been recorded as 5.31% to 7.5%.<sup>9-11</sup> Serum Alanine Aminotransferase (ALT) is the most frequently utilized screening test in routine evaluation of liver damage.<sup>12, 13</sup> ALT is most concentrated in liver and released into the bloodstream as the result of liver injury. It, therefore, serves as a fairly specific indicator of liver status.<sup>14,15</sup> However, there are conflicting reports on the relationship between the biochemical markers of inflammation and ALT.<sup>16</sup> Hence this study was designed with an aim to determine the seroprevalence of hepatitis C virus infection and its association with serum alanine aminotransferase in our population.

## Material and Methods

A cross-sectional study was conducted at clinical laboratory of Social security Hospital Islamabad, for a period of six months from May 2009 to October 2009. All blood samples referred for HCV profile were checked for anti HCV. Serum alanine aminotransferase was tested in those patients who were found positive for anti HCV. Samples were subjected to serological analysis for anti-HCV antibodies using rapid immune chromatography kits (ICT, Australia and Abbott, USA) and positive samples were confirmed by ELISA (IMX, Abbott, USA). ALT was performed by standard biochemical method on Microlab. Results were entered on SPSS version 14 for final analysis.

## Results

Total number of cases referred for HCV profile was 1006. Out of these 146 cases were positive for anti-HCV antibodies; hence overall positivity was 14.5%. Among these 55.5% were males and 44.5 % were females with male to female ratio of 1.2:1. Prevalence of Hepatitis C was found to be 8% in the age group of <20 years, and almost equal i.e. 46% and 49% in 20-40 years and more than 40 years groups respectively (table.1).

Age in years	No. (%)
<20	8 (5.48)
20-40	67 (45.89)
>40	71 (48.63)

Serum ALT level (U/l)	No. (%)	Mean $\pm$ S.D
<30	21(25.30)	21.81 $\pm$ 4.26
30-45	12(14.46)	35.17 $\pm$ 4.60
46-60	16(19.28)	53.38 $\pm$ 5.71
61-100	24(28.92)	78.58 $\pm$ 9.72
>100	10(12.05)	250.1 $\pm$ 186

Serum ALT was checked in total 83 patient's blood samples. Our study showed levels less than 30U/L in 21 patients, 30-45U/L in 12 patients, 46-60U/L in 16 patients, 61-100U/L in 24 patients and more than 100U/L in 10 patients (table.2). Reference ranges for ALT established in our lab are 3-33U/L.

## Discussion

Prevalence of HCV may be different in different regions and various groups of the same community.<sup>17</sup> In our hospital based study seroprevalence of HCV was 14.5%. Hospital-based studies revealed seroprevalence rates of anti-HCV as 5.31% in Islamabad,<sup>18</sup> 2.45%-20.89% in various parts of the Punjab province.<sup>4,19-20</sup> Seroprevalence of HCV was 4-6% in Karachi,<sup>5</sup> 5%-9% in North West Frontier Province (N-W.F.P)<sup>21,22</sup> and 25.7% in Northern Areas.<sup>23</sup> Our study is partially in agreement with another study, in which prevalence of active HCV infection in district Mansehra Pakistan was 7%<sup>1</sup>. Slightly higher prevalence of HCV was recorded in the earth quake affected areas of Pakistan in 2005.<sup>3</sup> High prevalence of HCV infection in male population has earlier been recorded by other studies from Pakistan and around the globe. In our hospital based study

males were more commonly affected than females, the results comparable with another study conducted by Ahmed et al at Jinnah Postgraduate Medical Centre, Karachi as 55% Hepatitis C cases were males and 45 % females.<sup>24</sup>

In relation to age group we also observed a high prevalence of HCV among adults i.e. more than 40 years (48.63%) followed by individuals between 20-40 years (45.89 %). On the other hand, the prevalence in less than 20 year age group was significantly low (5.48%). This shows that the prevalence of HCV increased with increasing age. This was in agreement with another study that showed high prevalence of HCV among middle-aged (40-50 years) group and lowest between 21-30 years.<sup>1</sup>

In developing countries, ALT testing continues to be employed as a diagnostic marker for HCV infection based on the assumption that recent HCV infection can be detected earlier by ALT than by anti-HCV. The serological screening test may miss a hepatitis C virus infection before hepatitis C virus antibodies are detected.<sup>12, 25</sup> In 63% of patients in our study value of ALT were found to be between 30-100U/L. This study is in agreement with a study conducted in Postgraduate Institute of Peshawar which showed that majority of HCV-positive patients in different stages of infection had ALT levels between 41-80U/L; the study also showed that there is a close correlation between elevation of ALT and HCV infection.<sup>26</sup> This pattern is strongly supported by the works of Wang, Rodger, and Shang who found a strong correlation between the prevalence of an elevated serum ALT level and HCV positivity.<sup>26-29</sup> This finding suggests that we can use the prevalence of an elevated serum ALT level for identifying the communities with high prevalence of HCV infection. Considering that the per unit cost of the anti-HCV test is 5 to 25 times that of the serum ALT level test, the overall cost for conducting such regional or national survey of HVC infection can be significantly reduced using the serum ALT levels. Moreover, performing serum ALT levels in the field is much more feasible than performing the anti-HCV test. Our data has important implications in terms of cost, and feasibility for monitoring a communicable disease in communities, particularly in hyper endemic areas. In summary, the prevalence of an elevated serum ALT level is a valuable index for identifying the communities at the high risk of HCV infection. Population with elevated serum ALT levels may then be checked for HCV infection.<sup>26, 27</sup>

## Conclusion

The present study revealed that prevalence of HCV was 14.5% and that there was a close correlation of ALT with anti HCV positivity. It is recommended that if screening for HCV is not possible then ALT should be checked and a mild elevation in ALT should be taken as a base for HCV screening.

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