A Correlative Study Between Biochemical and Hematological Parameters and Hepatitis C Prevalence in the Premises of Faisalabad

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Abstract: Hepatitis C virus (HCV) is an infectious agent which is responsible for liver diseases, cirrhosis and hepatocellular carcinoma. The present work was designed to find out the correlation between biochemical and hematological parameters and its prevalence. ALT and AST values were higher than normal in HCV positive patients (119.34 U/L), (108.21 U/L) had the significance correlation with HCV. ALP values were higher and hemoglobin values were lower but in normal range (242.28 U/L), (11.34 g/dL). Hemoglobin is decreased in chronic cases when there is lower liver efficiency. Platelet count was low in some cases as this parameter is affected with progress of disease (136.69 µ/L) and ESR is raised more than its normal values (48.48 mm/hour). There is no so significant correlation of other parameters as bear ALT and AST. So ALT is more sensitive indicator of any liver abnormality and most commonly used as the primary indicator of liver function. In conclusion, the prevalence of HCV infections is substantially higher in Faisalabad city and the Microparticle Enzyme Immuno Assay (MEIA) is a useful method for epidemiology of viral Hepatitis C.

Key word: Hepatitis C - ALP - ALT - AST - MEIA

INTRODUCTION

Many infectious diseases afflicting human beings are caused by viruses. Some viral diseases are very important because they are frequently fatal; including “Viral Hepatitis” [1]. The Hepatitis C virus (HCV) is the member of the hepacivirus genus in the family Flaviviridae). Hepatitis C is a blood-borne infectious disease that is caused by the hepatitis C virus HCV, affecting the liver [2]. Asymptomatic infection occurred initially, but chronic hepatitis developed which lead to inflammation, signs and symptoms may appear that are generally caused by either decreased liver function or increased pressure in the liver circulation [3]. The mechanisms responsible for the HCV life cycle in the liver of infected individuals are only partially understood because it has not been possible to infect normal human hepatocytes in culture with naturally occurring HCV obtained from HCV-infected patients and because HCV is known to infect only humans and chimpanzees [4]. The symptoms of acute hepatitis C infection include decreased appetite, fatigue, abdominal pain, jaundice, itching and flu-like symptoms [5]. Approximately 15-40% of persons infected with HCV clear the virus from their bodies during the acute phase as shown by normalization in liver function tests (LFTs) such as alanine transaminase (ALT) and aspartate transaminase (AST) normalization, as well as plasma HCV-RNA clearance. The remaining 60-85% of patients infected with HCV develops chronic hepatitis C [6]. HCV transmission by in apparent percutaneous exposures has been caused by cross-contamination from reused syringes, needle, multiple-use medication vials, infusion bags and injecting-drug use paraphernalia [7].

The present research work will provide update data regarding hepatitis C prevalence, its correlation with biochemical and hematological parameters in the population of Faisalabad (Pakistan).

MATERIALS AND METHODS

Research work was planned to find out the prevalence of Hepatitis C and its epidemiology from different regions of Faisalabad.

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Place of Work: All the serological and biochemical analyses were performed in Bio-care Lab., Aziz Fatimah Hospital, Institute of Molecular Biology and Biotechnology, The University of Lahore and Enzyme Biotechnology Lab., University of Agriculture, Faisalabad.

Patient Selection: Sample collection was done from selected 100 individuals randomly from different regions of Faisalabad. Patients were considered to have hepatitis C infection if their ELISA was positive and had raised alanine aminotransferase (ALT).

Biochemical and Hematological Analysis: All samples were tested on AXSYM fully automated immune-analyzer from Abbott Diagnostics USA, obeying the Micro particle Enzyme Immune Assay (MEIA) principle, by the 3rd generation technology [6]. Alanine aminotransferase (ALT), Aspartate aminotransferase (AST) and Alkaline phosphatase (ALP) were estimated on Hitachi 902 fully automated chemistry analyzer by Roche Diagnostics Germany. A kinetic method for the determination of ALT activity according to recommendations of IFCC without pyridoxalphosphate activation [8]. Hematology parameters Hb, PLT were carried out on Sysmex XS800i (5-part Differential fully automated hematology analyzer) and ESR was done on MicroSed system by vital Diagnostics.

Blood Samples Treatment: 6-8 ml blood was drawn by using sterilized syringes by vein puncture technique, divided it into two tubes, 4-5ml in plain sterilized tube and tri-Potassium EDTA coated tubes. Plain tube was allowed to left more than half hour at room temperature for clot, then finally centrifuged at 4000 rpm for 15 minutes, separated serum fractions were transferred in autoclaved ellipotes and placed in AXSYM.

RESULTS

The age groups of 10-20 years contains 10% individuals out of which 80% were found negative and 20% cases were shown result as positive for hepatitis C. In negative cases the results revealed that serum ALT, AST and ALP levels were 26.38±5.78, 23.25±4.95 and 168.50±16.81 U/L, respectively while positive cases revealed the value of serum ALT, AST and ALP 73.50±12.02, 64.50±14.85 and 285.00±42.43 U/L, respectively (Figs. 1,2,3). The hemoglobin concentration cases it was 110.00±14.14 µ/L (Fig. 5). The ESR (erythrocyte sedimentation rates) of negative cases was 7.75±5.85 and the values of ESR find raised in the positive cases as 47.50±10.61 mm/h (Fig. 6).

The age groups of 21-30 years contains 60% individuals out of which 73.33% were found negative and 26.67% cases were declared as positive for hepatitis C.
In negative cases the results revealed that serum ALT, AST and ALP levels were 32.85±12.37, 28.60±10.62 and 165.58±14.62 U/L, respectively while positive cases revealed the value of serum ALT, AST and ALP 98.19±23.58, 87.50±3.54 and 247.13±86.71 U/L, respectively (Figs. 1,2,3). The hemoglobin concentration in negative and positive cases was 13.94±1.47 and 13.89±1.50 g/dL, respectively (Fig. 4). The platelet counts of negative cases were 266.78±103.96 and among positive cases it was 114.00±16.97 µ/L (Fig. 5). The ESR (erythrocyte sedimentation rates) of negative cases was 14.89±9.61 and the values of ESR find raised in the positive cases as 23.50±26.16 mm/h (Fig. 6).

The age groups of 41-50 years contains 10% individuals out of which 60% were found negative and 40% cases were declared as positive for hepatitis C. In negative cases the results revealed that serum ALT, AST and ALP levels were 35.33±3.79, 30.67±3.21 and 173.00±19.52 U/L, respectively while positive cases revealed the value of serum ALT, AST and ALP 99.50±41.15, 90.00±34.73 and 222.00±66.39 U/L, respectively (Figs. 1,2,3). The hemoglobin concentration in negative and positive cases was 14.33±0.84 and 12.05±2.80 g/dL, respectively (Fig. 4). The platelet counts of negative cases were 265.33±80.26 and among positive cases it was 110.00±54.64 µ/L (Fig. 5). The ESR (erythrocyte sedimentation rates) of negative cases was 12.67±5.77 and the values of ESR find raised in the positive cases as 51.25±37.05 mm/h (Fig. 6).

The age groups of 51-60 years contains 5% individuals out of which 40% were found negative and 60% cases were declared as positive for hepatitis C. In negative cases the results revealed that serum ALT, AST and ALP levels were 35.50±2.12, 23.25±4.95 and 164.50±6.36 U/L, respectively while positive cases revealed the value of serum ALT, AST and ALP 73.50±12.02, 64.50±14.85 and 246.00±80.07 U/L, respectively (Figs. 1,2,3). The hemoglobin concentration in negative and positive cases was 16.60±0.28 and 10.60±1.83 g/dL, respectively (Fig. 4). The platelet counts of negative cases were 362.50±80.26 and among positive cases it was 81.00±10.54 µ/L (Fig. 5). The ESR (erythrocyte sedimentation rates) of negative cases was 3.50±2.12 and the values of ESR find raised in the positive cases as 85.33±37.07 mm/h (Fig. 6).
The age groups of 61+ years contain 4% individuals out of which 50% were found negative and 50% cases were declared as positive for hepatitis C. In negative cases the results revealed that serum ALT, AST and ALP levels were 29.50±6.36, 31.50±3.54 and 161.50±13.44 U/L, respectively, while positive cases revealed the value of serum ALT, AST and ALP 140.50±68.59, 115.00±43.84 and 223.50±81.32 U/L, respectively (Figs. 1,2,3). The platelet counts of negative cases were 310.50±156.27 and among positive cases it was 114.50±21.92 µ/L (Fig. 5). The ESR (erythrocyte sedimentation rates) of negative cases was 19.50±6.36 and the values of ESR find raised in the positive cases as 78.50±3.54 mm/h (Fig. 6).

**DISCUSSION**

Higher values of ALT in HCV positive patients were found in this present study while lower values in HCV negative patients that were in normal range. However an increased level of ALT is generally a result of liver disease associated with some degree of hepatic necrosis such as cirrhosis, carcinoma, viral or toxic hepatitis [9]. Normally ALT remained within the hepatocytes, but on damaging of hepatocyte, the enzyme escape out from hepatocytes and raised levels were found in the blood hence, there is significant correlation of ALT and HCV. As both ALT and AST are associated with liver diseases, liver damage, intraoperative hypotension, intraoperative blood loss, liver reseption significantly correlated with liver enzyme elevations [9].

In HCV positive patients the higher values of AST were found as the raised values are found in liver cirrhosis, haemolysis, myocardial infarction, acute viral hepatitis, toxic hepatitis. As very high values are also obtained in toxic hepatitis due to carbon tetrachloride poisoning and obstructive jaundice. ALT level is also found to be increased with age [5]. Increase in both transaminases is found in liver diseases with ALT much higher than AST. Serum ALT remains the most accessible test for monitoring the chronic hepatitis C viral infection [5]. AST/ALT ratio is highly specific and predictive (100%) of cirrhosis in patients with chronic HCV infection. The mean AST/ALT ratio in patients with chronic HCV infection with cirrhosis was significantly higher than in patients without cirrhosis. The ratio correlated positively with the stage of fibrosis [10]. The present study revealed higher values of ALP in HCV positive and lower values in HCV negative individuals that were with in the normal range. It has been reported in literature that serum ALP level increased with increasing age, body mass index, C-reactive protein, monocyte count, serum uric acid, lead, cadmium, hypercholesterolemia, diabetes, smoking, non-alcohol drinking, sex, age, liver diseases, lesion of liver and cardiovascular disease [11].

Our results indicated lower values of hemoglobin in HCV positive patients while values in HCV negative patients were within normal limits. Thus in advanced liver disease when albumin synthesis is impaired, the plasma oncotic pressure which prevents loss of fluid into tissue spaces is lost and generalized edema occurs. As in hepatitis the synthesis of albumin is impaired so lower values are found in hepatitis and liver cirrhosis. There is significance correlation of hemoglobin with HCV as the values are slightly lower in HCV positive patients [12].

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**REFERENCES**


