CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3232886

Available online at: http://www.iajps.com Research Article

ASSESSMENT OF CHANGES IN LIVER ENZYMES IN THE PATIENTS SUFFERING FROM LIVER CIRRHOSIS

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Article Received: March 2019 **Accepted:** April 2019 **Published:** May 2019

Abstract:
Introduction: *Chronic liver disease (CLD) is a major cause of morbidity and mortality and is quickly becoming an increasing burden on the health care system.* ***Objectives:*** *The main purpose of this study is to assess the changes in liver enzymes in the patients suffering from liver cirrhosis.* ***Methodology of the study:*** *This cross sectional study was conducted in Health department of Punjab during September 2018 to January 2019. The data was collected through non-probability sampling technique. The data was collected from 100 liver cirrhosis patients. The age range for this study was 20 to 60 years. Blood sample was collected for the serum analysis of liver enzymes. Alanin aminotransferase (ALT) and Aspartate aminotransferase (AST) were assayed by Reitman and Frankel method. Alkaline phosphatase was determined by King and Kind.* ***Results:*** *The data was collected from 100 patients of both genders. The mean age of the patients were 45.67±3.56 years. The levels of ALT in patients was 258.2±91.73, 79.66±28.63, and 50.73± 8.4 respectively as compared to normal control (11±3.42). Aspartate aminotransferase levels were significantly raised in viral hepatitis, alcoholic liver disease and cirrhosis patients. The levels being 157.80±67.8, 164±54.35, and 62±12.17 respectively as compared to normal control (13±3.54).* ***Conclusion:*** *It is concluded that the level of all liver enzymes become increases in cirrhosis condition. Liver associated enzymes tests are used to detect, specifically diagnose, and estimate the severity of hepatic disease.*

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Please cite this article in press Usama Umair et al., ***Assessment Of Changes In Liver Enzymes In The Patients Suffering From Liver Cirrhosis.,*** *Indo Am. J. P. Sci, 2019*

INTRODUCTION:

Chronic liver disease (CLD) is a major cause of morbidity and mortality and is quickly becoming an increasing burden on the health care system. Both CLD and cirrhosis are the fifth leading cause of death in the 45–61 age group and 12th leading cause overall. In 2010, the National Center for Health Statistics (NCHS) and Centers for Disease Control and Prevention (CDC) reported 31,903 deaths from CLD and cirrhosis [1]. This number is expected to increase steadily well in the next decade. The prevalence of cirrhosis in the general population is difficult to determine and was estimated to be 1 in 679 (0.15%) in a recent study published by the National Institute of Health (NIH). This could represent a gross underestimation of 1 in 370 (0.27%) as suggested in a recent study by Scagilone et al, where the prevalence was estimated based on the 2010 US census [2]. The liver is the largest organ of the body, weighing 1 to 1.5 kg and representing 1.5 to 2.5% of the lean body mass. Liver is a complex organ with interdependent metabolic, excretory and defense functions. The use of several screening tests improves the detection of hepato-biliary abnormalities, helps differentiate the basis for clinically suspected disease and determine the severity of liver disease [3]. Blood tests used for initial assessment of liver disease include measuring levels of serum Alanine and Aspartate aminotransferases (ALT and AST), alkaline phosphatase, and others. The pattern of abnormalities generally points to hepatocellular versus cholestatic liver disease and helps to decide whether the disease is acute or chronic and whether cirrhosis and hepatic failure are present. Serum enzyme levels fluctuate widely from normal to moderately abnormal, with values rarely into the high hundreds [4]. Marked elevation of aminotransferases in the appropriate clinical context indicates acute cell necrosis caused by viral infection, drugs, toxins, alcohol, or Ischemia [5]. Hepatocellular carcinoma (HCC) accounts for >80% of liver cancer cases. Approximately 78% of HCC was attributable to hepatitis B virus (HBV) or hepatitis C virus (HCV) infection[4]. Also, presence of cirrhosis from any cause markedly increases HCC risk [6]. The overall age-adjusted HCC incidence rate in the United States tripled between 1975 and 2005, partially accounted for by the increase of HCV infection and the influx of immigrants from HBV endemic regions. According to the World Health Organization, HCC has the second highest increase in overall death rate of all malignancies and its burden is expected to continue to increase in the next a few decades [7].

Objectives

The main purpose of this study is to assess the changes in liver enzymes in the patients suffering from liver cirrhosis.

METHODOLOGY OF THE STUDY:

This cross sectional study was conducted in Health department of Punjab during September 2018 to January 2019. The data was collected through non-probability sampling technique. The data was collected from 100 liver cirrhosis patients. The age range for this study was 20 to 60 years. Blood sample was collected for the serum analysis of liver enzymes. Alanin aminotransferase (ALT) and Aspartate aminotransferase (AST) were assayed by Reitman and Frankel method. Alkaline phosphatase was determined by King and Kind. Gamma Glutamyl Transferase (GGT) was determined.

Statistical Analysis

Statistical analysis was done using SPSS for Windows version 17.0. Results expressed as mean ±SD). Comparison of variables between two groups performed with student t-test for continuous variables. The p values < 0.05 were considered statically significant.

RESULTS:

The data was collected from 100 patients of both genders. The mean age of the patients were 45.67±3.56 years. The levels of ALT in patients was 258.2±91.73, 79.66±28.63, and 50.73± 8.4 respectively as compared to normal control (11±3.42). Aspartate aminotransferase levels were significantly raised in viral hepatitis, alcoholic liver disease and cirrhosis patients. The levels being 157.80±67.8, 164±54.35, and 62±12.17 respectively as compared to normal control (13±3.54). Alkaline phosphatase levels were significantly raised in viral hepatitis, alcoholic liver disease and cirrhosis patients. Gamma glutamyle transpeptidase levels were significantly raised in viral hepatitis, alcoholic liver disease and cirrhosis patients.

Table 01: Level of all liver enzymes in liver cirrhosis

	Control	Viral Hepatitis	Alcoholic Liver	Liver cirrhosis
ALT	11.20±3.43	258.20±91.73	79.66±28.63	50.73±8.40
AST	13.00±3.54	157.80±67.81	164.00±54.35	62.13±12.17
ALP	36.20±9.54	208.00±54.40	180.33±33.30	116.00±11.98
GGT	26.73±4.02611	115.33±28.31	181.33±60.66	248.66±43.5

DISCUSSION:

An indicator that should make the clinician highly suspicious of alcohol-related liver injury is AST: ALT ratio of 2:1 or more. Gamma-glutamyl transferase (GGT) is another sensitive but non-specific marker for hepatic injury which cannot be used solely to diagnose alcohol-related hepatic insult. Levels of GGT greater than twice the normal values in addition to AST: ALT ratio >2 strongly indicate alcohol-induced liver injury as well [8]. The liver associated enzymes, Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), and gamma glutamyl transferase (GGT) are measures of liver homeostasis. Serum amino transferases such as alanine aminotransferase (ALT) and aspartate aminotransferase (AST) indicate the concentration of hepatic intracellular enzymes that have leaked into the circulation. These are the markers for hepatocellular injury [9]. The aminotransferases (transaminases) are sensitive indicators of liver cell injury and are most helpful in recognizing acute hepatocellular diseases such as hepatitis[8]. The pattern of the aminotransferase elevation can be helpful diagnostically. This helps to differentiate ALD from other liver diseases. In this study AST, ALT ALP, GGT levels were significantly raised in viral hepatitis, alcoholic liver disease and cirrhosis patients as compared to control. In viral hepatitis AST, ALT and ALP Levels were significantly high as compared to alcoholic liver disease and cirrhosis [10]. Moreover alcoholic liver disease patients have more AST, ALT and ALP as compared to cirrhosis. In addition to viral infections and cirrhosis, environmental factors such as smoking and alcohol intake are well known risk factors of HCC development. In our study, we noticed that ever smoking conferred a borderline increase in HCC risk which was consistent with previous studies [11].

CONCLUSION:

It is concluded that the level of all liver enzymes become increases in cirrhosis condition. Liver associated enzymes tests are used to detect, specifically diagnose, and estimate the severity of hepatic disease. AST and ALT are also the most common laboratory values that clinicians check when evaluating liver function. Based on our study, AST showed some progressive increase and was statistically significant in advanced liver disease, whereas ALT which is more liver specific did not show this correlation.

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