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Original Article

Liver Function Tests in Hepatitis C Patients of Local Population of Lahore

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ABSTRACT

Hepatic fibrosis is a chronic disease that results from hepatitis C infection. The tests used to screen for chronic liver disease are known as serum biochemical liver tests (LTs) (alanine aminotransferase, aspartate aminotransferase, and gamma glutamyl transferase). **Objectives:** To determine the prevalence and etiologies of abnormal LTs in the population of Lahore, Pakistan. To determine whether there is any correlation of HCV infection and viral load to the clinical parameters such as ALT, AST, ALP, bilirubin, patient's age and gender. **Methods**: Liver function tests (ALT, AST, and Bilirubin) were carried out using standard kits and a regular chemical analyzer in a photometric manner. **Results:** In our research, we gathered information from 80 patients, out of whom 27 women and 53 men. HCV was more common in the adult population aged 30 years or older and in men than in women. These individuals had elevated levels of several biochemical markers as ALT, AST, and ALP. **Conclusions:** Based on the results of this research and our investigation, we saw instances of viral hepatitis being diagnosed in asymptomatic patients with abnormal LFTs. The findings of the present investigation showed that men and patients under the age of 30 in Lahore had a significant frequency of abnormal LTs. Test results reveal biochemical markers at particularly elevated levels. Implementing initiatives to lessen the potential burden of chronic liver disease may benefit from knowing the estimated prevalence and etiologies of aberrant LTs (CLD).

INTRODUCTION

Hepatitis is a medical illness that is characterized by the presence of inflammatory cells in the tissue of the organ and is described as the inflammation of the liver. Each of the five main forms of hepatitis—A, B, C, D, and E—is brought on by a separate hepatitis virus. The hepatitis C virus was initially discovered in 1989 [1]. Clinical symptoms, genotypes, and viral load are excellent indicators of how well antiviral medication will work in individuals with HCV infection [2, 3]. The hepatitis C virus (HCV), which mostly damages the liver, is the cause of the extremely contagious illness known as hepatitis C [4]. The most prevalent blood-borne chronic infection in the world is hepatitis C virus (HCV) infection [5]. The hepatitis C virus is an RNA virus with a single-stranded, positive-sense genome that is tiny, enclosed, and single-stranded [6]. A single open reading frame made up of 9600 nucleotide bases makes up the HCV genome [7]. There are seven genotypes of the hepatitis C virus species, with many subtypes within each genotype, based on genetic changes across HCV [8]. HCV is a member of the genus Hepacivirus and family Flaviviridae. The infection that causes HCV is chronic and lifelong [9]. About 3% of people are thought to be infected with HCV globally [10]. Hepatocellular carcinoma, cirrhosis, and liver failure are the most common liver consequences in individuals with persistent HCV and HBV infections and may occur in 15%–40% of cases [11]. Acute or chronic hepatitis C infection are both possible. 15% of instances of hepatitis C infection might result in acute symptoms [12]. Nausea, exhaustion, reduced appetite, joint or muscle discomfort, and weight loss are all signs of an acute infection [13]. In the majority of acute infection cases, jaundice is absent [14]. About 80% of instances of chronic infection [15] result from very few or no symptoms during the first few years of infection [16]. Hepatitis C may be diagnosed using a variety

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of procedures, such as the quantitative HCV RNA polymerase chain reaction, recombinant immunoblot assay, and HCV antibody enzyme immunoassay, or ELISA (PCR). By measuring the quantities of several proteins and enzymes in the blood that may either be created by the liver cells themselves or released when the liver cells are damaged, LFTs are one of the most often carried out "blood tests" in primary care. LFT tests are often performed on people who have liver disease suspicions. The Alanine transaminase (ALT), Aspartate aminotransferase (AST), Alkaline phosphatase (ALP), and bilirubin assays are among the liver function tests [17, 18].

METHODS

It was a Cross -sectional study design. This study was carried out in the Department of Pathology King Edward Medical University Lahore. Non-probability sampling technique was followed for sampling. Duration of the study was 3 months. 80 subjects will be included in study. Inclusion Criteria: 1. The patients with hepatitis C. 2. Patients of both sexes and all age groups. 3. Patients without prior treatment. Exclusion Criteria: 1. Patients without hepatitis C virus infection. Tourniquet was tightened on the arm for the identification of suitable vein in front of elbow, 3-5ml of venous blood was collected aseptically and samples was allowed to clot for half an hour, then samples was centrifuged and serum was separated from all the samples for following investigations. Liver functioning tests (ALT, AST, Bilirubin) was performed photo-metrically having standard kits with routine chemical analyzer. The term "liver function tests" includes several tests including Alanine transaminase (ALT), Aspartate aminotransferase (AST), Alkaline phosphatase (ALP) and bilirubin. Aminotransferases and alkaline phosphate are used to detect damage to liver cells and obstruction by bile. No single test is able to provide an overall measure of liver function. So, a group of tests are available to determine the liver disease, possible causes and the severity of disease. Laboratory tests of liver function can also be used to monitor the progress of disease and the response to treatments. Data were analyzed by SPSS Version. 16

RESULTS

In Table 1, we determined the AST value by making its different ranges to see its frequency among male and female patients. In AST ranges from 20 to 40, there are total 28 patients in which 21 are males and 7 are females. In the second range, 41 to 60, 21 are the total .patients in which 12 are males and 9 are females. In the third range, 61 to 80, 17 are total number of patients in which 11 are males and 6 are females. In the fourth range, 81 to 100, 14 are the total number of patients in which 9 are males and 5 are females.

AST	Male	Female	Total patients
20-40	21	7	28
41-60	12	9	21
61-80	11	6	17
81-100	9	5	14
Total Patients	53	27	80

Table 1: AST in HCV patients

In Table 2, there is age wise distribution of AST in HCV patients is determined by making age ranges and also making the different ranges of AST among male and female patients and then observes the male to female ratio.

AST	20-40		41-60		61-80		81-100		M/F Ratio		Total patients
Age range (Yrs.)	M	F	M	F	M	F	M	F	M	F	
1-15	1	0	2	1	1	2	1	1	5	4	9
16-30	7	3	3	1	4	1	2	0	16	5	21
31-45	3	2	2	3	2	0	1	1	8	6	14
46-60	4	0	1	2	1	1	2	1	8	4	12
61-75	4	1	2	2	2	2	1	0	9	5	14
>75	2	1	2	0	1	0	2	2	7	3	10
M/F Ratio	21	7	12	9	11	6	9	5	53	27	80
Total patients	28		21		17		14		80		

Table 2: Age wise distribution of AST in HCV patients

In Table 3, we determined the ALT value by making its different ranges to see its frequency among male and female patients. In the first range (25 to 50), 19 are the total patients in which 14 are males and 5 are females. Second range (51 to 75), 15 are total patients in which 7 are males and 8 are females. Third range (76 to 100), 10 are total patients in which 7 are males and 3 are females. Fourth range (101 to 150), 10 are total patients in which 6 are males and 4 are females. Fifth range (151 to 200), 2 are total patients, 1 is male and 1 is female. Sixth range (201 to 300), 10 are total patients, 8 are males and 2 are females. Seventh range (301 to 350), 10 are total patients, 7 are males and 3 are females. Eighth range (600 to 650), 4 are total patients in which 3 are males and only 1 is female patient.

AST	Total Patients		
	Males	Female	Total patients
25-50	14	5	19
51-75	7	8	15
76-100	7	3	10
101-150	6	4	10
151-200	1	1	2
201-300	8	2	10
301-350	7	3	10
600-650	3	1	4
Total Patients	53	27	80

Table 3: ALT in HCV Patients

In Table 4, age wise distribution of ALT in HCV patients are determined by making age ranges and also by making different ranges of ALT among male and female patients and then observe male to female ratio.

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AST	25-50		51-75		76-100		101-150		151-200		201-300		301-350		600-650		M/F Ratio		Total patients
Age range (Yrs.)	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
1-15	2	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	4	1	5
16-30	4	1	1	2	1	1	1	1	0	0	2	0	1	0	1	0	11	5	16
31-45	3	2	2	1	2	1	2	2	1	0	1	1	2	1	1	1	14	9	23
46-60	2	0	2	2	1	0	1	0	0	1	2	1	1	0	0	0	9	4	13
61-75	2	1	2	1	2	0	1	1	0	0	1	0	1	1	1	0	10	4	14
>75	1	1	0	1	0	1	1	0	0	0	1	0	2	1	0	0	5	4	9
M/F Ratio	14	5	7	8	7	3	6	4	1	1	8	2	7	3	3	1	53	27	80
Total patients	19		15		10		10		2		10		10		4		80		

Table 4: Age wise distribution of ALT in HCV patients

In Figure 1, we determined the ALP values by making its different ranges to see its frequency among male and female patients. In the first range (60 to 120), 9 are the total patients among which 5 are males and 4 are females. Second range (121 to 180), 15 are total patients in which 7 are males and 8 are females. Third range (181 to 240), 16 are total patients in which 14 are males and 2 are females. Fourth range (241 to 300), 7 are total patients in which 4 are males and 3 are females. Fifth range (301 to 360), 11 are total patients in which 9 are males and 2 are females. Sixth range (361 to 420), 8 are total patients in which 5 are males and 3 are females. Seventh range (421 to 480), 5 are total patients in which 3 are males and 2 are females. Eighth range (481 to 540), 9 are total patients in which 6 are males and 3 are females.

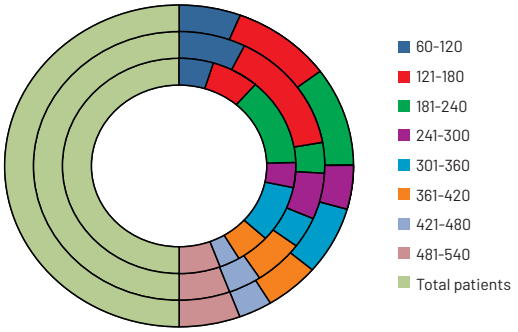

Figure 1: Pie Chart of ALP in HCV Patients

In Figure 2, age wise distribution of ALP in HCV patients are determined by making age ranges and different ranges of ALP among male and female patients and then observe male to female ratio.

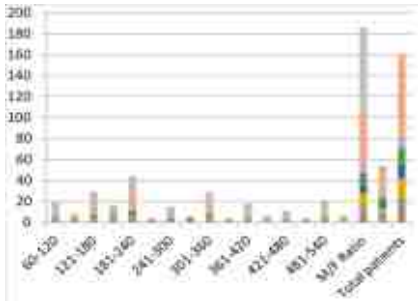

Figure 2: Column chart showing age wise distribution of HCV patients according to ALP level

In Figure 3, we determined the Bilirubin values by making its different ranges to see its frequency among male and female patients. In the first range (0.1-1), 33 are the total patients among which 19 are males and 14 are females. Second range (1.0-2), 18 are total patients in which 12 are males and 6 are females. Third range (2.0-3), 14 are total patients in which 9 are males and 5 are females. Fourth range (3.0-4), 8 are total patients in which 7 are males and 1 is female. Fifth range (4.0-5), 7 are total patients in which 6 are males and 1 are females.

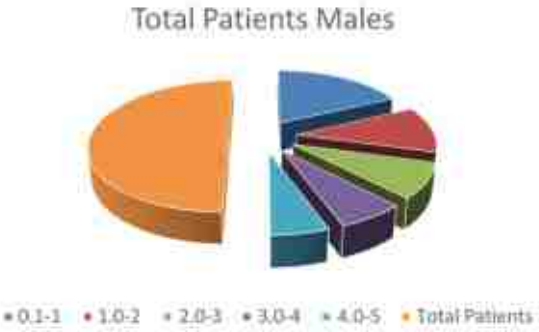

Figure 3: Pie chart of Bilirubin in HCV patients

In Figure 4, age wise distribution of Bilirubin in HCV patients is determined by making age ranges and different ranges of Bilirubin among male and female patients and then observe male to female ratio.

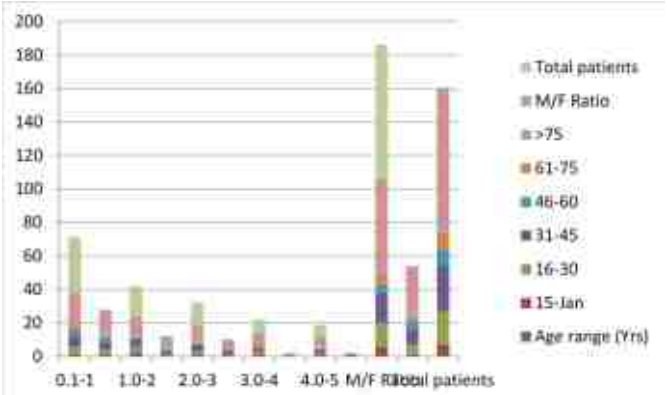

Figure 4: Column chart showing age wise distribution of HCV patients according to Bilirubin levels

DISCUSSION

In our study, patients older than 30 years had HCV dominance. Recent research conducted in Pakistan found that, respectively, 0.2% and 0.4% of kids under the age of 12 and those between the ages of 12 and 19 have hepatitis C [19]. The majority of the people in our survey belongs to the middle socioeconomic class. The main goal of this study was to determine how the hepatitis C virus infection affected the LFTs in infected individuals' serum. The data from our patients in our most recent study revealed distinct gender-related disparities in the distribution of HCV infection. However, individuals under the age of 30

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showed a greater prevalence of HCV. Similar results were seen by another study in Egypt by Kandeel *et al.*, who also found increased incidence of Hepatitis C in same ag group [20]. In our study, we collected the data of 80 patients infected with HCV infection among which 53 are the male patients and the rest of 27 are female patients. So, from this result we conclude that our study data showed more prevalence of HCV infection in males than in females. We evaluate the frequency of different clinical markers with HCV infection, we observed that the clinical markers AST, ALT, ALP and Bilirubin were raised in all the patients especially the patients < 30years of age. In recent study, ALP levels are very high in adult patients. A change in ALP levels greater than 120 U/L can be indicative of advanced disease progression. Age groups of the patients were made and observe the frequency in different age groups, age group of 31- 40 years were the highest frequency rates. The highest frequency of patients had AST in the range of 20-40 IU/L, the highest frequency of patients had ALT in the range of 25-50IU/L and the highest frequency of patients had ALP in the range of 121-180 IU/L. The different level of Bilirubin in HCV patients(males/females) was examined in 80 patients, out of them 33 patients had bilirubin level in the range of 0.1-1 (mg/dl), 18 patients (males/females) had bilirubin level in the range of 1.0-2 (mg/dl), 13 patients (males/females) had bilirubin level in the range of 2.0-3 9mg/dl0, 8 patients (males/females) had bilirubin level in the range of 3.0-4 (mg/dl) and 8 patients (males/females) had bilirubin level in the range of 4.0-5(mg/dl).

CONCLUSIONS

Based on this research and the results of our investigation, we noticed that asymptomatic individuals with abnormal LFTs might have viral hepatitis. The findings of the present investigation showed that men and patients under the age of 30 in Lahore had a significant frequency of abnormal LTs. Test results reveal biochemical markers at particularly elevated levels. Implementing initiatives to lessen the potential burden of chronic liver disease may benefit from knowing the estimated prevalence and etiologies of aberrant LTs (CLD). Our findings also lead us to the conclusion that adult male patients are more likely to have HCV infection.

Conflicts of Interest

The authors declare no conflict of interest.

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