

Biochemical Parameter of Liver in Congestive Cardiac Failure

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ABSTRACT

Introduction: Liver dysfunctions associated with heart failure are mild in nature and discovered accidentally during routine biochemical investigations. The aim of the present study was to determine the importance of liver biochemical markers amongst patients of heart failure.

Material and methods: The present prospective study was conducted in the Department of Biochemistry, Kakatiya Medical College and MGM Hospital, Warangal, Telangana, India during a period of one year. It was conducted from June 2016 to July 2017. The controls were age matched with the cases. Appropriate laboratory investigations were done to determine both direct and indirect total serum bilirubin. Serum aspartate and alanine aminotransferase, serum alkaline phosphatase levels were also estimated. Patient's serum albumin, proteins and prothrombin time was also taken into consideration. All the results were arranged in a tabulated form and analysed using SPSS software.

Results: There were a total of 60 subjects who were enrolled in the study. The mean age of the subjects was 34.56 \pm 4.32 years. The mean age of females was 32.45 \pm 3.44 years and males were 37.76 \pm 5.41 years. The total bilirubin level amongst cases was 1.84 \pm 0.89 and controls were 0.85 \pm 0.74. The conjugated bilirubin level amongst cases was 0.20 \pm 0.18 and controls were 0.05 \pm 0.04. The unconjugated bilirubin level amongst cases was 1.61 \pm 0.97 and controls were 0.83 \pm 0.32.

Conclusion: From the present study it is clearly evident that there is significant difference in the level of hepatic markers amongst patients of heart failure and controls.

Keywords: Bilirubin, Cardiac, Liver, Unconjugated

INTRODUCTION

Liver which is the largest gland in human body, performs many complex functions in humans. The prime conditions that aid in liver for performing these functions are increased blood flow rates and a close proximity of sinusoids with the hepatocytes.¹ Because of liver's abundance blood supply and high metabolic rate, it is the one most commonly affected by the circulatory disturbances.² As a result of heart failure, various pathophysiological changes occur in the human body which ultimately lead to liver cell death.³ Due to this reason abnormalities in liver are common during heart failure. Liver dysfunctions associated with heart failure are mild in nature and discovered accidentally during routine biochemical investigations.⁴ There is a mild elevation of serum bilirubin especially with high levels of unconjugated portion.⁵ Various factors that contribute towards this alteration include obstruction of the cannaliculi due to distention, hemolysis, pulmonary infarction, sepsis and medicaments etc.⁶ Biochemical tests of liver are an important tool to estimate the

duration and severity of heart failure. If adequate treatment is provided for heart condition then the derangements in liver function are bound to become normal again and prevent the development of permanent liver dysfunction.⁷ The aim of the present study was to determine the importance of liver biochemical markers amongst patients of heart failure.

MATERIAL AND METHODS

The present prospective study was conducted in the Department of Biochemistry, Kakatiya Medical College and MGM Hospital, Warangal, Telangana, India during a period of one year. It was conducted from June 2016 to July 2017. Ethical committee clearance was obtained from the institute's ethical board and all the subjects were informed about the study and a written consent was obtained from all in their vernacular language. Patients of congestive heart failure amongst any age group were included in the study. Patients with history of jaundice, alcoholism, use of hepatotoxic drugs, pregnancy or lactation were excluded from the study. Hepatitis patients were also excluded from the study. In the present study 30 subjects of congestive heart failure were grouped into the case group and 30 healthy subjects were regarded as controls. The controls were age matched with the cases. Appropriate laboratory investigations were done to determine both direct and indirect total serum bilirubin. Serum aspartate and alanine aminotransferase, serum alkaline phosphatase levels were also estimated. Patient's serum albumin, proteins and prothrombin time was also taken into consideration.

STATISTICAL ANALYSIS

All the results were arranged in a tabulated form and analysed using SPSS software. The results were expressed as mean \pm standard deviation and analysed using student t test. Probability value of less than 0.05 was considered as significant.

RESULTS

There were a total of 60 subjects who were enrolled in the study. The mean age of the subjects was 34.56 \pm 4.32 years. The mean age of females was 32.45 \pm 3.44 years and males were 37.76 \pm 5.41 years.

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Table 1, Figure 1 shows the gender distribution of subjects enrolled in the study. There were 38 (63.3%) males and 22 (36.7%) females in the study.

Table 2 shows the biochemical markers amongst the study and control. The mean liver size amongst cases was 14.55 +/-3.01 cm and amongst controls were 12.76 +/-2.33. On applying student t test there was significant difference in the mean liver size amongst cases and controls as the p value was less than 0.05. The total bilirubin level amongst cases was 1.84 +/-0.89 and controls were 0.85 +/-0.74. There was significant difference between cases and controls. The conjugated bilirubin level amongst cases was 0.20 +/-0.18 and controls were 0.05 +/-0.04. There was significant difference between cases and controls. The unconjugated bilirubin level amongst cases was 1.61 +/-0.97 and controls were 0.83 +/-0.32. There was significant difference between cases and controls. SGOT level amongst cases and controls were 113.58 +/- 45.54 and 42.54 +/-15.75 respectively. There was significant difference between cases and controls. SGOT level amongst cases and controls were 113.58 +/-45.54 and 42.54 +/-15.75 respectively. There was significant difference between cases and controls. SGPT level amongst cases and controls were 99.87 +/- 10.54 and 37.50 +/-15.20 respectively. There was significant difference between cases and controls. The mean prothrombin time amongst cases was 14.57 +/-3.12 and controls were 11.22 +/- 1.31. There was a significant difference in the mean prothrombin time between

cases and controls

DISCUSSION

Abnormalities in the liver function that occur during heart failure are mild in nature and are discovered incidently during routine investigations.⁸ In symptomatic cases, it presents as mild jaundice. In chronic heart failure cases, at times jaundice becomes so severe that it suggests of biliary obstruction. In cases where there is significant AT elevation along with jaundice in patients of cardiac decompression, it gives a clinical picture similar to acute viral hepatitis. Jaundice which occurs in cases of right sided heart failure is clinically and pathophysiologically distinct from ischemic hepatitis.⁹ Levels of bilirubin come to normal level quickly after the resolution of heart failure. To differentiate cardiac from obstructive jaundice, the level of serum alkaline phosphatase should be observed. It reaches to normal in cases of cardiac jaundice.¹⁰ It takes around only a week to reach to normal value. Levels of serum alanine transferase are sometimes extremely elevated giving an illusion of viral hepatitis, this is true in cases where heart failure is complicated by hypotension.¹¹ In the present study, The mean liver size amongst cases was 14.55 +/-3.01 cm and amongst controls were 12.76 +/-2.33. On applying student t test there was significant difference in the mean liver size amongst cases and controls as the p value was less than 0.05. The total bilirubin level amongst cases was 1.84 +/-0.89 and controls were 0.85 +/-0.74. The conjugated bilirubin level amongst cases was 0.20 +/-0.18 and controls were 0.05 +/-0.04. There was significant difference between cases and controls. The unconjugated bilirubin level amongst cases was 1.61 +/-0.97 and controls were 0.83 +/-0.32. SGOT level amongst cases and controls were 113.58 +/- 45.54 and 42.54 +/-15.75 respectively. SGOT level amongst cases and controls were 113.58 +/- 45.54 and 42.54 +/-15.75 respectively. SGPT level amongst cases and controls were 99.87 +/- 10.54 and 37.50 +/-15.20 respectively. The mean prothrombin time amongst cases was 14.57 +/-3.12 and controls were 11.22 +/- 1.31. There was a significant difference in the mean prothrombin time between cases and controls. In patients of cardiac decompensation, serum albumin levels are decreased to 30- 50% and the amount of change is similar in patients of acute and chronic heart failure.¹² Serum albumin levels tends to become normal in one or few months after treatment. Prothrombin time is increased in 80 to 90% of the patients of

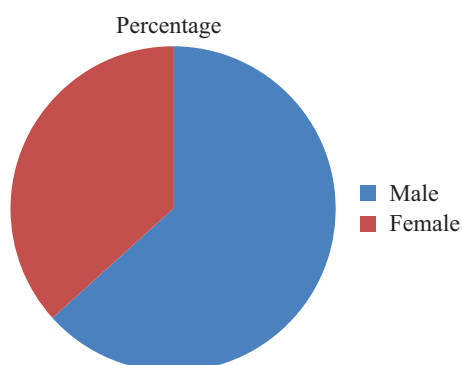


Figure-1: Gender distribution of subjects

Gender	Number	Percentage
Male	38	63.3%
Female	22	36.7%

Table-1: Gender distribution of subjects

Biochemical marker	Study group (Mean +/- SD)	Control group (Mean +/- SD)	P value
Liver Size (cm)	14.55 +/-3.01	12.76 +/-2.33	<0.05
Total Serum Bilirubin (mg/dl)	1.84 +/-0.89	0.85 +/-0.74	<0.05
Conjugated Bilirubin (mg/dl)	0.20 +/-0.18	0.05 +/-0.04	<0.05
Unconjugated Bilirubin (mg/dl)	1.61 +/-0.97	0.83 +/-0.32	<0.05
SGOT (U/l)	113.58 +/- 45.54	42.54 +/-15.75	<0.05
SGPT (U/l)	99.87 +/- 10.54	37.50 +/-15.20	<0.05
Serum Albumin (g/dl)	3.37 +/- 0.42	4.14 +/- 0.37	<0.05
Prothrombin time (sec.)	14.57 +/-3.12	11.22 +/- 1.31	<0.05

Table-2: Biochemical markers amongst the study subjects

acute and chronic cardiac failure. This is because of decrease in the synthesis of vitamin K based clotting factors and it takes 2 to 3 weeks to reach normalize after treatment.¹⁷ In a study conducted by Koletsky et al, in the year 1945, he found that there were 4.4% of post-mortem cases who had cardiac cirrhosis amongst 790 patients who died of heart disease.¹³ In another study conducted by Kubo et al in 1987 and others, massive elevation in Serum alanine transferase levels were found amongst patients of cardiogenic shock.¹⁴⁻¹⁶

CONCLUSION

From the present study it is clearly evident that there is significant difference in the level of hepatic markers amongst patients of heart failure and controls. The levels tend to normalize after a period of time if appropriate treatment is provided. The treatment should be mainly focussed on the underlying heart problem.

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