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# Study Of Liver Function Tests In Patients Presented With Features Of Congestive Cardiac Failure.

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**Abstract**
**Background:** Heart failure (HF) is a complex clinical syndrome characterised by abnormalities of left ventricular function and neurohumoral regulation, which are accompanied by effort intolerance, fluid retention and reduced longitivity. Although the clinical syndrome of HF may result from abnormalities or disorders involving all aspects of cardiac structure and function, most patients have impairment of myocardial function, ranging from normal ventricular size and function to marked dilation and reduced function.
**Aim of the study**
To study clinical profile of patients presented with features of congestive cardiac failure.To study abnormal liver function test as per etiology of heart failure.To study whether liver function tests can be used as a prognostic marker in patients with congestive cardiac failure.
**Material and Method :**
The article topic entitled "**Study of liver function tests in patients presented with features of congestive cardiac failure :A hospital based study**" is a prospective cross sectional and analytical study has been carried out in the Deptt.of Medicine ,Gauhati Medical College & Hospital,for a period of one year from 1st June 2019 to 31st May 2020 after approval of the Institutional Ethical Committee. Proper history and clinical examination was carried out in each patient presented with features of congestive cardiac failure.The present study consist of 117 cases presented with features of congestive cardiac failure in departmant of general medicine, gauhati medical college & hospital, guwahati .
**Results :**
In this present study, most common age group affected was found to be in between 61 to 70 years (50/117 cases,42.73%) indicating that advanced age groups is associated with increase incidence of congestive cardiac failure with slight male preponderance (male :female ,1.43:1).
In this study ,most common etiology of congestive cardiac failure was found to be coronary artery disease (44/117 cases,37.6%) followed by rheumatic heart disease (29/117 cases, 24.8%).Least common cause was found to be hypertensive heart disease (11/117 cases,9.4 %).
The present study shows significant changes in liver biochemical abnormalities in patients with congestive cardiac failure. These changes are useful in assessing the severity of heart failure. The present study suggest an early detection of liver function abnormalities in congestive cardiac failure.
**Conclusion :**
Study revealed marked alterations in liver function with acute heart failure and during hypotension when compared to chronic heart failure. Low serum proteins and serum albumin levels are seen in many of the cases. Various factors play in causing these changes which have already been discussed. Study revealed marked alterations in liver function with acute heart failure and during hypotension when compared to chronic heart failure. Low serum proteins and serum albumin levels are seen in many of the cases. Various factors play in causing these changes which have already been discussed **.**
**Key words:** congestive cardiac failure, Liver function test, Rheumatic heart disease, New York heart association, coronary artery disease.

## I. INTRODUCTION

Liver is the largest gland of human body has many complex functions. For liver to perform its primary function, high rates of blood flow and close contact between sinusoids and hepatocytes are essential. As a result of its complex vascular supply and high level of metabolic activity, liver is highly vulnerable to variety of circulatory disturbance.(**Bynum TE, Boitnott JK etal.1974)**

Heart failure (HF) is a complex clinical syndrome characterised by abnormalities of left ventricular function and neurohumoral regulation, which are accompanied by effort intolerance, fluid retention and reduced longitivity. Although the clinical syndrome of HF may result from abnormalities or disorders involving all aspects of cardiac structure and function, most patients have

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impairment of myocardial function, ranging from normal ventricular size and function to marked dilation and reduced function. HF is subdivided into systolic and diastolic failure. Systolic heart failure represent impaired ventricular contraction whereas diastolic heart failure is due to impaired cardiac relaxation with abnormal ventricular filling(**Braunwald : Heart disease 2001).** Heart failure can result from several structural, functional, congenital that impair the ability of ventricles to fill or eject blood. A spectrum of hepatic derangement can also occur in heart failure particularly in right heart failure.In right heart failure raised backpressure causes congestion of the hepatic sinusoids and hepatocyte hypoxia. Left heart failure produces decreased cardiac output further causing decreased blood flow to the liver producing hypoxia. Both this mechanism leads eventually into centrilobular liver cell necrosis and finally hepatic injury (**Eugene R et al 2003).** Bridging fibrosis and cardiac cirrhosis can result from prolonged haemodynamic changes, resulting in impaired hepatic functions with abnormal coagulation profile, reduced albumin synthesis which can lead to variety of toxicities.(**Gibson PR et al.1984)** Heart failure causes a number of pathophysiological changes which alone or in combination causes liver injury .Different liver injuries include veno occlusive disease, congestion, infarction and ischaemia prevalence of which is 65%. Liver receives 25% of cardiac output and it has the capacity to withstand changes in blood flow by vasoactive mechanisms and oxygen extraction from blood. However, when the critical levels are reached, hepatic injury ensues (**Narasingarao S et al.2019**). Abnormal liver function tests on admission are common in HF patients secondary to passive hepatic congestion and low perfusion to the liver ,resulting in altered haemodynamic (**Lau GT 2002)** .

## II. MATERIALS AND METHODS

The article topic entitled "**Study of liver function tests in patients presented with features of congestive cardiac failure :A hospital based study**" is a prospective cross sectional and analytical study has been carried out in the Deptt.of Medicine ,Gauhati Medical College & Hospital,for a period of one year from 1st June 2019 to 31st May 2020. Proper history and clinical examination was carried out in each patient presented with features.

**Inclusion criteria:**

1. Cases of congestive cardiac failure, as per Framingham criteria of various etiology:
   - ✓ Rheumatic heart disease
   - ✓ Hypertensive heart disease
   - ✓ Ischaemic heart disease
   - ✓ Cardiomyopathy
   - ✓ Corpulmonale
   - ✓ Hypothyroidism & hyperthyroidism
2. Congestive heart failure either acute or chronic presentation.

**EXCLUSION CRITERIA**:

1. Known alcoholics.
2. Recent intake of hepatotoxic drugs causing elevated liver enzymes.
3. Age less than 12 years.
4. Positive viral markers.

**The following biochemical tests are carried out in this study**

- Serum bilirubin
- Serum transaminases
- Serum alkaline phosphatase
- Serum protein
- Prothrombin time

**Serum bilirubin :**

Serum bilirubin was estimated by the vanden bergh reaction. In this reaction the bilirubin pigments are diazotized by sulphalinic acid and the chromatographic products are measured calorimetrically. Vanden bergh reaction can be used to distinguish between conjugated and unconjugated bilirubin because of the different solubility properties of the pigments. When the reaction is carried out in an aqueous medium, the water soluble conjugated bilirubin reacts to give the direct van den Bergh reaction. When the reaction is carried out in ethanol, the intramolecular hydrogen bonds of unconjugated bilirubin are broken. Thus both conjugated and unconjugated pigments react giving the total bilirubin level.

**Serum transaminases(AST/ALT)**

In this study AST and ALT was measured by enzymatic substrate method. AST and ALT substrates along with dinitro phenyl hydrannel were used. The enzyme catalyses the exchange of gamma amino group of alanine to the gamma keto group of glutamate forming oxalo-acetic acid and pyruvic acid.

**Serum alkaline phosphatase:**

A variety of assays have been developed to measure alkaline phosphatase using different

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substrates. The substrates used were aminoantipyrine solution, alkaline phosphate buffer, potassium ferricyanide and substrate. Increased levels of ALP shows biliary tract dysfunction. Slight to moderate elevation in ALP activity can occur in congestive cardiac failure. The raised levels signify rise in the synthesis of ALP by liver cells and biliary epithelium.

**Serum Proteins:**

Widespread hepatic damage leads to reduction in serum levels of fibrinogen, prothrombin, albumin and other proteins which are produced exclusively by the liver cells. The estimation of serum proteins signify hepatic synthetic function. The most major protein synthesized by the liver is albumin. Normal level ranges from 3.5-5.5 mg/dl. It has a long half-life i.e 14-20 days and daily turn-over is less than 5%. Hence it is not an accurate indicator of acute hepatic damage. Serum globulins include alpha and beta globulins as well as immunoglobulins. Normal value is 2-3.5 mg/dl. Hyperglobulinemia occurs secondary to activation of the reticulo-endothelial system in response to the antigens presented passing through the liver.Serum proteins are estimated by Biuret method. Substances which contain 2 or more peptide bonds and CO-NH2 groups give a purple or blue coloured precipitate with alkaline copper solution. Different proteins give differing amount of colour which helps in distinguishing them by this reaction.

**Prothrombin time:**

Liver synthesizes six coagulation factors namely Fibrinogen , factors V,VII,IX,X. Abnormalities of these coagulation factors can be most efficiently determined by the prothrombin time which measures the rate of prothrombin conversion to thrombin in the presence of thromboplastin and calcium and requires the integrity of vitamin K dependent coagulation factors. The prothrombin time is dependent on normal hepatic synthesis of clotting factors and sufficient intestinal uptake of vitamin K. Acute or chronic parenchymal liver injury may lead to prolongation of the prothrombin time due to impaired synthesis of clotting proteins, because these proteins have a shorter half life, the prothrombin time may be regarded as an earlier indicator of severe liver injury and its elevation in both acute or chronic hepatocellular injury serves as an ominous prognostic sign.

## III. RESULTS & OBSERVATIONS

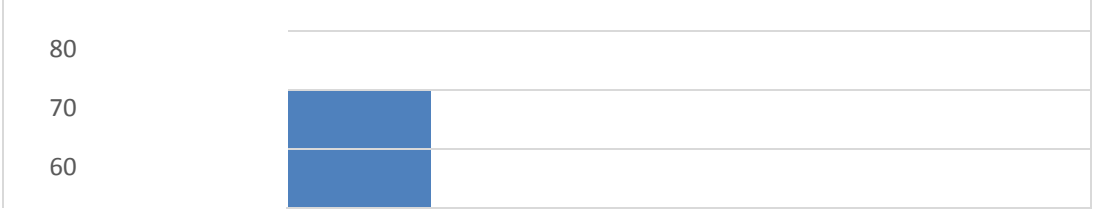
The article topic entitled "**Study of liver function tests in patients presented with features of congestive cardiac failure :A hospital based study**" has been carried out in the Department of Medicine ,Gauhati Medical College & Hospital,for a period of one year from 1st June 2019 to 31st May 2020. All the patients presented with features of congestive cardiac failure are included in this study irrespective of sex distribution. Individual below 12 years of age,known ethanolic,those on hepatotoxic drugs, are excluded from this study.

**Sex distribution of cases**

Out of 117 cases presented with features of congestive cardiac failure, there is a slight male prepoderence with male:female ratio 1.43:1.( Table1) .

**Table 1: Sex distribution of cases**

| Sex | Cases | Percentage |
|---|---|---|
| Male | 69 | 59 |
| Female | 48 | 41 |
| Total | 117 | 100 |



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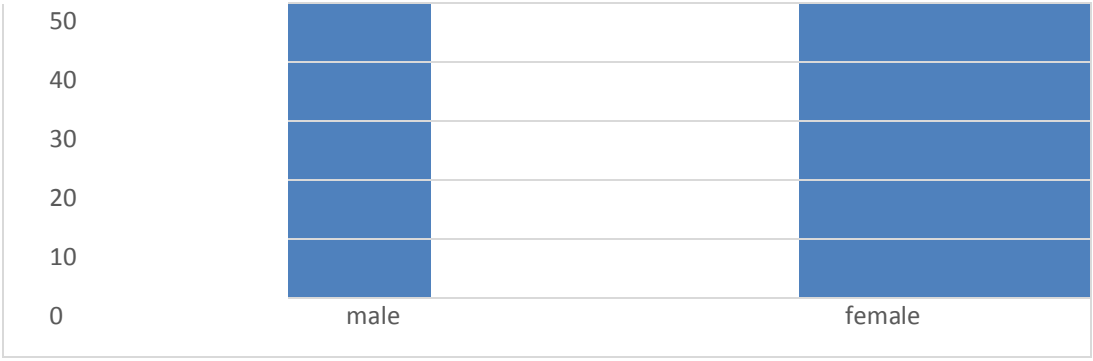


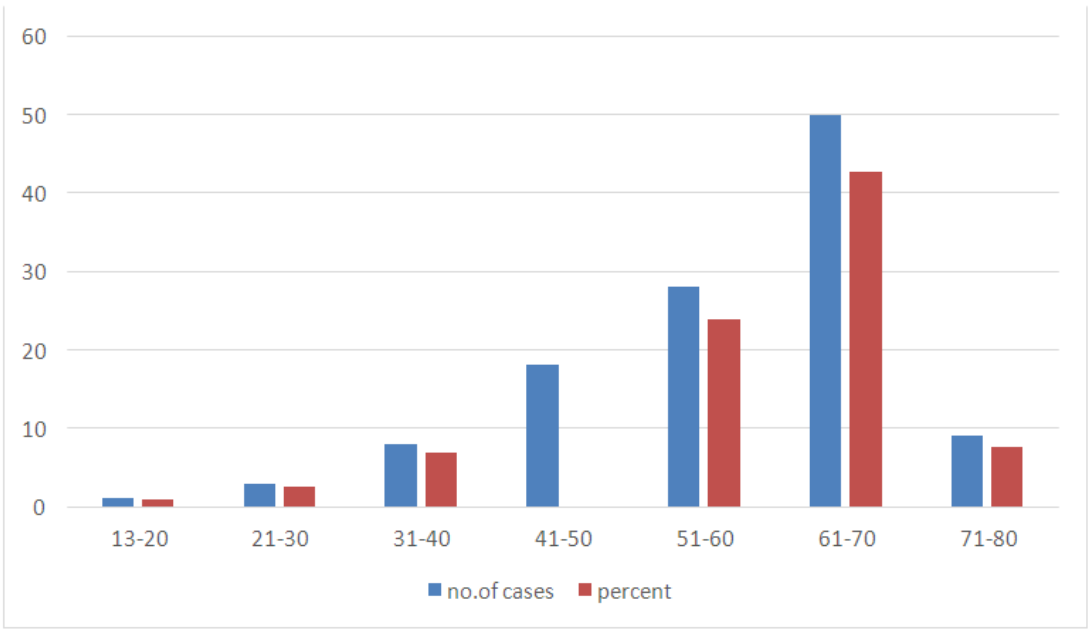

**Bar diagram showing sex distribution of cases.**

**Age distribution of cases**

In this study age above 12 years up to 80 years are included. Out of this the most common age group that is affected are in between 61-70 years of age indicating the increase incidence of cardiac failure with advanced age groups.( Table 2)

**Table 2: Age wise distribution of cases**

| Age group | No of cases | Percentage |
|---|---|---|
| 13-20 | 1 | 0.85 |
| 21-30 | 3 | 2.56 |
| 31-40 | 8 | 6.84 |
| 41-50 | 18 | 15.40 |
| 51-60 | 28 | 23.93 |
| 61-70 | 50 | 42.73 |
| 71-80 | 9 | 7.69 |
| Total | 117 | 100 |




**Bar diagram showing age distribution of cases**

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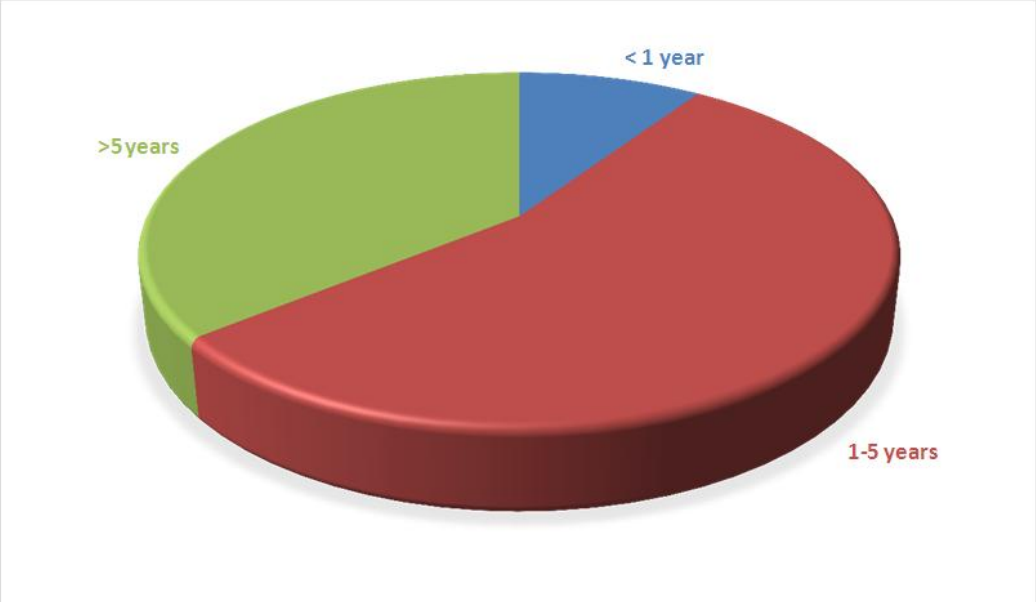
**Duration of congestive cardiac failure** out of 117 cases, duration of illness between 1 to 5 years is 64 cases (54.7%) followed by more than 5 years i.e 35.9 % (table 3)

**Table 3 : duration of illness**

| Duration of illness | No of cases | Percentage |
|---|---|---|
| Less than 1 year | 11 | 9.4 |
| 1 to 5 years | 64 | 54.7 |
| More than 5 years | 42 | 35.9 |
| Total | 117 | 100 |




**Pie diagram showing duration of congestive cardiac failure.**

**Etiology of congestive cardiac failure**

Out of 117 cases maximum numbers of causes that lead to congestive cardiac failure include coronary artery disease (37.6%) followed by rheumatic heart disease (24.8%) (Table 4)

**Table 4: Etiology of congestive cardiac failure**

| Etiology | No. of cases | Percentage |
|---|---|---|
| Coronary artery disease | 44 | 37.6 |
| Cor pulmonale | 20 | 17.09 |
| Rheumatic heart disease | 29 | 24.80 |
| cardiomyopathy | 13 | 11.11 |
| Hypertensive heart disease | 11 | 9.4 |
| Total | 117 | 100 |

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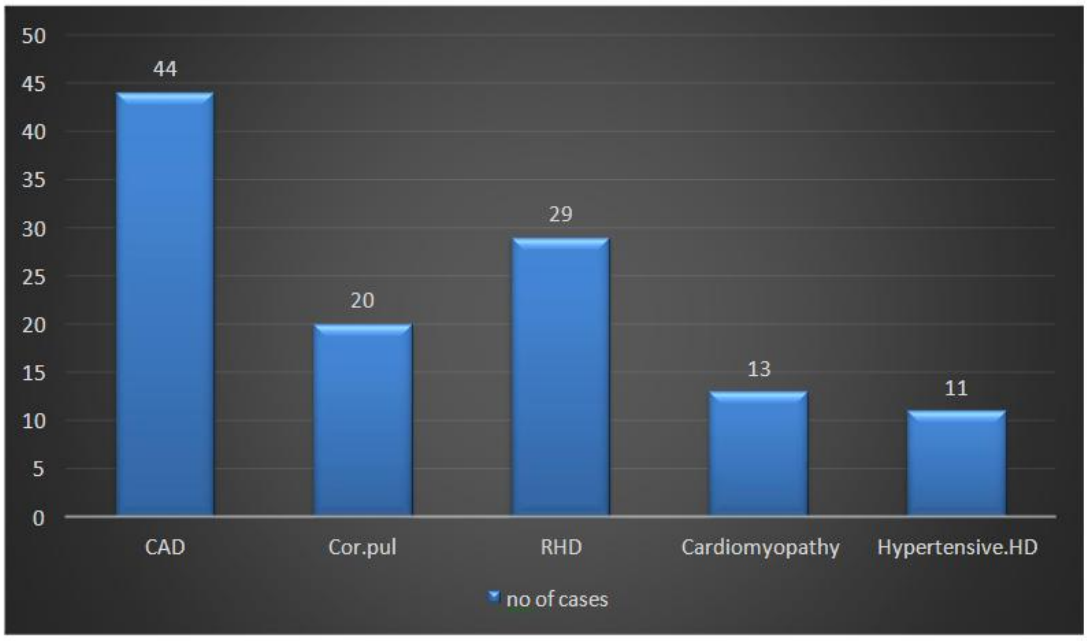


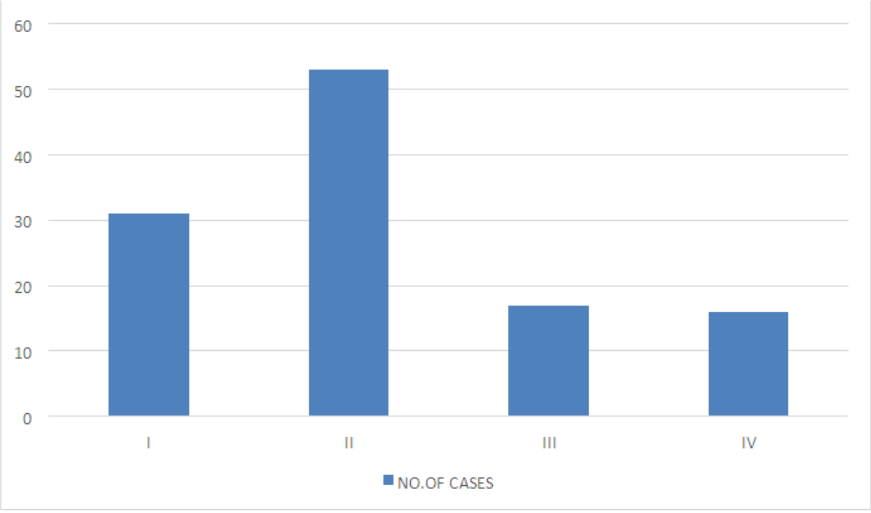

**Bar diagram showing different etiology of congestive cardiac failure**

**Distribution of cases according to NYHA classification**

Out of 117 cases studied maximum number of cases belong to NYHA II classification (45.3%) followed by NYHA I (26.50%). (Table 5)

**Table 5: case distribution according to NYHA classification**

| Grading | Number of cases | Percentage |
|---|---|---|
| NYHA I | 31 | 26.50 |
| NYHA II | 53 | 45.3 |
| NYHA III | 17 | 14.53 |
| NYHA IV | 16 | 13.67 |
| Total | 117 | 100 |




**Bar diagram showing distribution of cases according to NYHA classification.**

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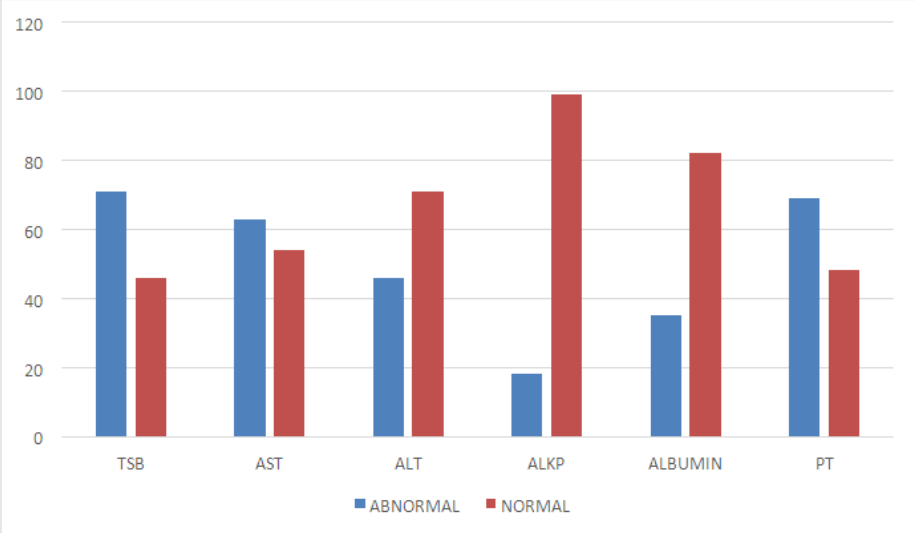
**Liver function tests abnormalities in this study**

In this study out of 117 cases, 71cases (60.68%) are found to have increased total serum bilirubin level ,while 63 cases (53.85%) are having raised AST level .Serum albumin level are reduced in 35 cases (29.91%) and prothrombin time is elevated in 69 cases (58.97%).(Table 6)

**Table 6: Liver biochemical abnormalities in this present study**

| LFT | Normal range | Abnormal (%) | Normal (%) |
|---|---|---|---|
| Serum bilirubin | 0.2 – 1.3 | 71(60.86) | 46(39.32) |
| AST | 14 -59 U/L | 63(53.85) | 54(46.15) |
| ALT | Up to 35 U/L | 46(39.32) | 71(60.68) |
| Sr.Alkaline phosphatise(ALKP) | 38-126 U/L | 18(15.38) | 99(84.62) |
| Sr. ALBUMIN | 3.5-5 g/dl | 35(29.91) | 82(70.09) |
| PT | 11-16 sec | 69(58.97) | 48(41.03) |




**Bar diagram showing liver function test abnormalities of this study.**

**Percentage of cases presented with clinically detectable jaundice**

Out of 117 cases it was found that 15.4% (18 cases) are presented with clinically detectable jaundice ,rest appear normal. (Table 7)

**Table 7: cases presented with jaundice**

| Jaundice | Number of cases | Percentage |
|---|---|---|
| Present | 18 | 15.4% |
| Absent | 99 | 84.6% |
| Total cases | 117 | 100 |

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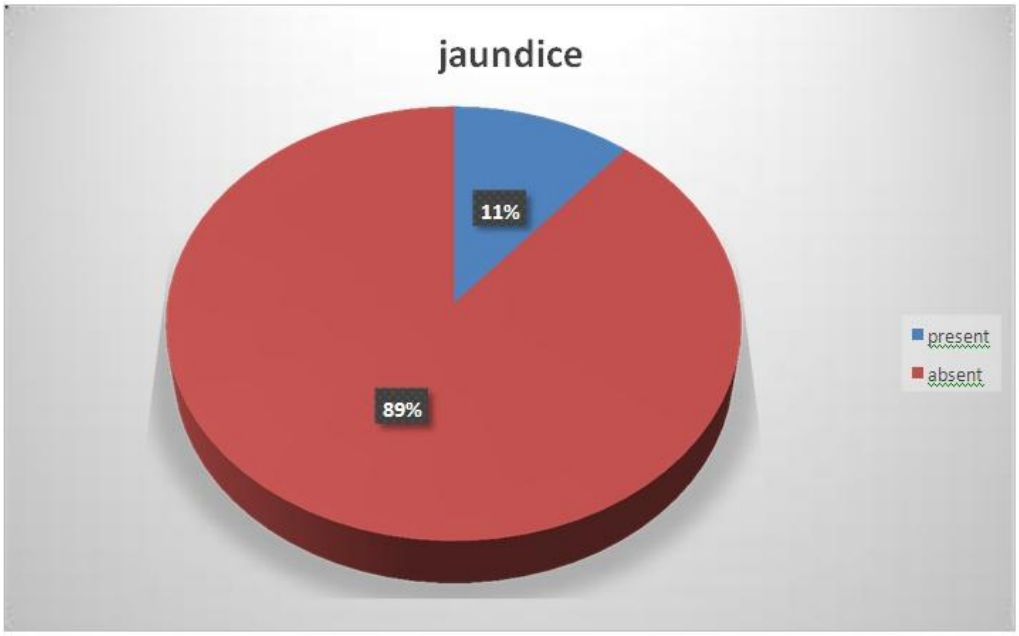


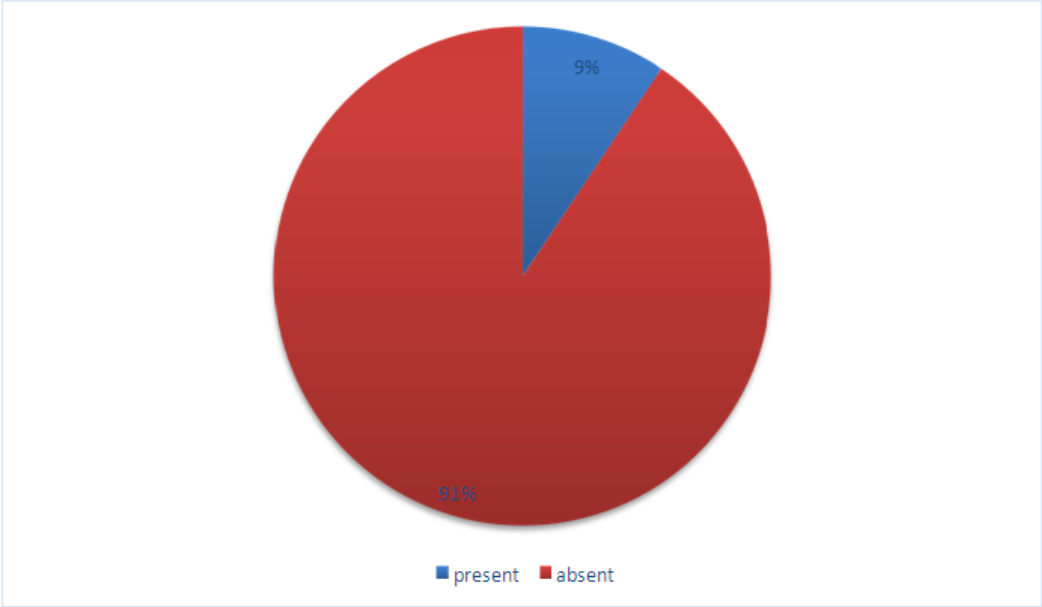

**Pie diagram showing clinically detectable jaundice in this present study.**

**Percentage of ascites in this study**

Out of 117 cases, 11 cases (9.4%) are presented with ascites on clinical presentation . (Table 9)

**Table 8: Cases with ascites**

| ASCITES | NUMBER OF CASES | PERCENTAGE |
|---|---|---|
| PRESENT | 11 | 9.40% |
| ABSENT | 106 | 90.6% |
| TOTAL | 117 | 100 |




**Pie diagram showing cases with ascites in this study.**

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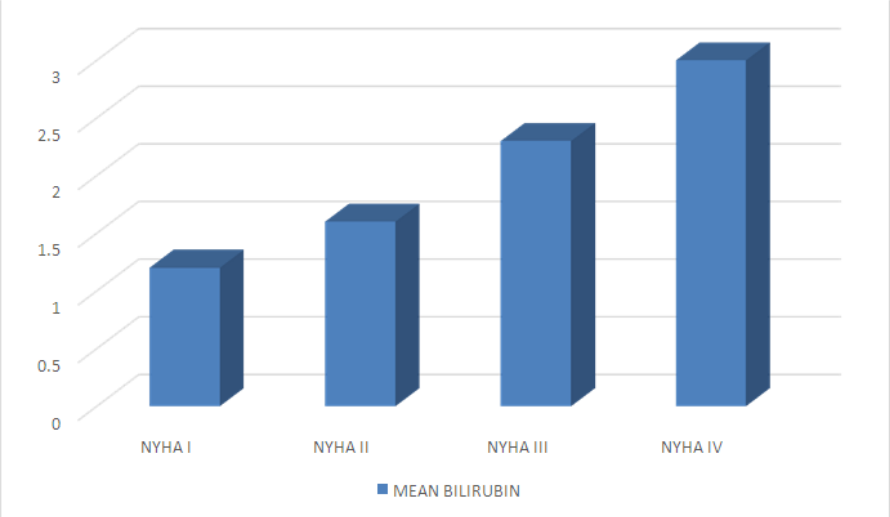
**Comparison of mean serum bilirubin level with NYHA class of heart failure**

Increase in serum bilirubin level is found to be associated with progressive worsening of NYHA class of heart failure, which show serum bilirubin is a prognostic indicator associated with heart failure severity. Class IV NYHA shows maximum increase in serum bilirubin level.(table 11)

**Table 9: Association of mean serum bilirubin with NYHA class**

| Grading | NO. OF CASES | MEAN BILIRUBIN |
|---|---|---|
| NYHA I | 31 | 1.2 |
| NYHA II | 53 | 1.6 |
| NYHA III | 17 | 2.3 |
| NYHA IV | 16 | 3 |




**Bar diagram shows comparison between mean bilirubin and NYHA classification.**

**Abnormal liver function tests as per etiology of heart failure**

In this study , out of 117 cases abnormal liver function test are found in 71 cases.

Highest number of liver function abnormalities are detected in coronary artery disease in which out of 44 cases 32 (72.7%) are having abnormal LFT (liver function test ) . This is followed by rheumatic heart disease which shows 65.5% liver function abnormalities. Least number of liver function abnormalities detected in hypertensive heart disease (27.27%). (Table 12)

**TABLE 10 : Showing abnormal liver function tests as per etiology of heart failure**

| Etiology | Total number of cases | Number of abnormal LFT | Percentage |
|---|---|---|---|
| CAD | 44 | 32 | 72.7% |
| RHD | 29 | 19 | 65.5% |
| CorPulmonale | 20 | 12 | 60% |
| cardiomyopathy | 13 | 5 | 38.5% |
| HHD | 11 | 3 | 27.27% |

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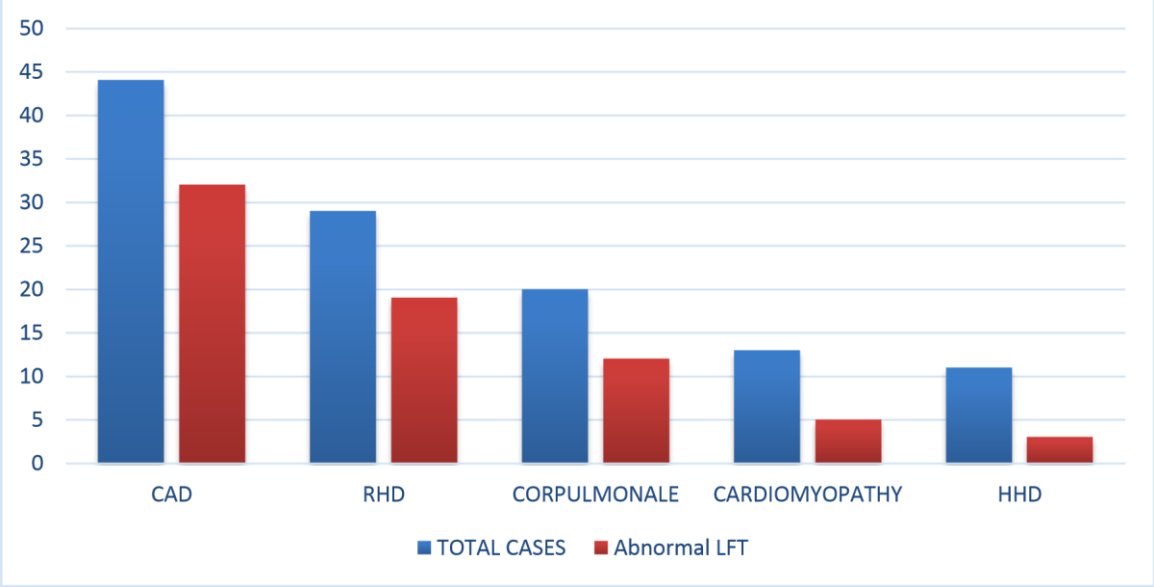


**Bar diagram showing abnormal LFT as per etiology of heart failure.**

## IV. DISCUSSION

Liver function abnormalities in a patient with congestive cardiac failure are considered to be derived from two haemodynamic alterations: low hepatic blood flow due to decreased cardiac output and high central venous pressure with atrophy of liver cells and oedema of the peripheral tissue ,both leading to hypoxic hepatocellular injury.

In this present study,liver biochemical abnormalities were analysed in 117 cases enrolled for study those were presented with feature of congestive cardiac failure and were recorded and compare with different study groups.

This present study showed a slight male preponderance in term of sex ,which is consistent with study performed by V.M Dan Deursew et at. (2010) and Deepa Gopal et al .( 2010 ) .

**Table11. : Sex distribution in different study groups**

| Study group | Male : Female |
|---|---|
| V M Dan Deursew et al (2010) | 1.5:1 |
| Deepa Gopal et al.(2010) | 1.02:1 |
| Present study (2020) | 1.43:1 |

In relation to age group commonly affected in congestive cardiac failure, it has been shown that incidence of heart failure increases with advance age group.In this present study ,most common age group that is highly involved included above 60 years of age(6170),which is consistent with study performed by Ali Ahmed MD MPH et al. (2006) (mean age group 68 years) .

In relation to aetiology of congestive cardiac failure, out of 117 cases studied most common cause of congestive cardiac failure is found to be coronary artery disease (CAD) in this present study, which is found to be consistent with study performed by Boback Ziaeian et al. (2016) and King M. et al.in ( 2012),they also found CAD is the most common etiology of congestive cardiac failure.

**Table 12 : Common etiology of congestive cardiac failure in different groups**

| Study groups | M.C etiology of CCF |
|---|---|
| King M et al. (2012) | Coronary artery disease |
| Boback Ziaeiabn et al.(2016) | Coronary artery disease |
| Present study (2020) | Coronary artery disease |

In relation to "New york heart association"(NHYA) classification, out of 117 cases studied most of the cases (45.3%) belongs to NYHA II class,which is consistent with the study performed by Ali Ahmed MD MPH et al. ( 2006) .

**Table 13: comparison according to NYHA class**

| Study groups | NYHA I | NYHA II | NYHA III | NYHA IV |
|---|---|---|---|---|
| Ali Ahmed et al.(2006) | 19.9% | 58%(m c) | 20.9% | 1.2% |
| Present study (2020) | 26.5% | 45.3% (mc) | 14.5% | 13.6% |

Out of 117 cases studied in this present study, 18 cases (15.4% ) were having clinically detectable jaundice at presentation . Alcohol induced jaundice and Jaundice due to hepatotoxic drugs were ruled out by relevant history taking . P.Ravikumar( 2017 ) also described clinically detectable jaundice in 20 % cases.

**Table 14: clinically detectable jaundice**

| Study groups | Presence of Jaundice (%) |
|---|---|
| P.Ravikumar (2017) | 20% |
| Present study (2020) | 15.4% |

In this present study ,out of 117 cases 55cases (47.01%) shows presence of hepatic enlargement. Study done by P.Ravikumar (2017) & Mathew Jeraud (2019),both found hepatic enlargement in congestive cardiac failure was 63 % each.

**Table 15 : Percentage of hepatomegaly in different study groups**

| Study groups | Hepatomegaly in CCF (%) |
|---|---|
| P.Ravikumar (2017) | 63 % |
| Jeraud M (2019) | 63 % |
| Present study (2020) | 47.01 % |

Ascites due to heart failure was present in 11 patients (9.4%) at the time of presentation, which is found to be consistent with study peformed by Ronyon Bruce A.MD . Study performed by Vlaerio Gianelli et al.( 2020 ) found that incidence of ascites in congestive cardiac failure was 33 % which is not consistent with this present study

In this present study it is found that abnormal serum aminotransferase level are found as AST 63 cases,(53.85%) and ALT 46 cases (39.32%) which is correlate with the study performed by Biegus J et al.( 2012) and Moussavian SN et al.(1982) in his study on alteration in liver functions in congestive cardiac failure with particular reference to liver enzymes

Serum alkaline phosphatase above 126 U/L is considered as abnormal in this present study. The present study observed elevation of serum alkaline phosphatase in 18 cases (15.3 %) out of 117 cases. Study performed by Jeraud M( 2019 ) and Varun Sundaram et al.( 2016 ) also observed abnormal serum alkaline phosphatase as 25 % & 14 % respectively which is found to be similar with this present study.

Table 16: comparison of elevation of serum alkaline phosphatase (ALKP) level (%) in different study groups

| Study groups | Abnormal ALKP (%) |
|---|---|
| Varun Sundaran MD et al. (2016) | 14 % |
| Jeraud M (2019) | 25 % |
| Present study (2020) | 15.3 % |

In this study, hypoalbuminemia ( normal : 3.5 -5 g/dl) was found in 35 cases (29.9%) out of 117 cases at the time of presentation ,which is found to be similar with study performed by Tamara B Horwich et al. (2008) & Biegus J et al.(2012) as 25 % and 40 % respectively. According

to Tamara B Horwich et al. it is observed that hypoalbuminemia is associated with congestive heart failure and is an independently associated with increase risk of death in heart failure. .Mild decrease in albumin levels were observed with values ranging from 2.5g/dl to 2.9g/dl. It was observed by Dunn et al. that cases with marked fluid retention showed albumin values less than 1.5g/dl. Serum albumin values usually return to normal in a period of few months following control of cardiac failure.

**Table 17 :Hypoalbuminemia in different study groups**

| Study groups | Hypoalbuminemia (%) |
|---|---|
| Tamara B Horwich et al. (2008) | 25 % |
| Biegus J et al. (2012) | 40 % |
| Present study (2020) | 29.9 % |

Prothrombin time is prolonged in 88 % of cases in a study performed by Mathew Jeraud in year 2019. Prothrombin time is prolonged in 80-90% of patients with acute and chronic heart failure according to White et al. Richman et al., and Safran AP et al.(1967) .However prothrombin time prolongation was observed in 69 cases (58.9%) out of 17 cases in this present study.

In this study with respect to hyperbilirubinemia ,out of 117 cases 71 cases (60.86%) have high total serum bilirubin level . As per etiology of congestive cardiac failure ,hyperbilirubinemia is most commonly associated with coronary artery disease 72.7 % cases followed by rheumatic heart disease 65.5% .Hypertensive heart disease was least commonly associated with hyperbilrubinemia 27.2 % cases in this present study. Most of the cases have total serum bilirubin level less than 3 mg/dl ,while bilirubin level more than 3 mg/dl was found in 28 cases in this study & maximum increase in serum bilirubin was seen upto 5.1mg/dl in this study (2 cases) and were associated with signs nad symptoms of severe congestive cardiac failure.

Study conducted by Jeraud M . in 2019 also observed that 77 % of his study population had increased in total serum bilirubin level which is consistent with this present study. Another study conducted by Jayakrishna Chintanaboina et al. (2013) had found that 70% of his study population had increased in serum bilirubin level which is consistent with this present study. Author also concluded that in patients with acute decompensated heart failure elevated total serum bilirubin level on admission with or without low ejection fraction (<35%),predict worst prognosis. BatinP.Wickens M et al (1995) in a study of 552 patients of chronic heart failure suggested that all abnormal LFT are associated with mortality ,but AST and total serum bilirubin level show highest association. Scholfield M et al.(2014) & Solovera A et al.(2016) found that 36.1% & 72 % cases respectively were associated with hyperbilirubinemia . Scholfield M. et al. concluded that increased in total serum bilirubin is associated with a significantly lower cardiac index and higher central venous pressure and it predict worst outcome in patients with congestive cardiac failure.

In this study it is also noted that with increased in mean serum bilirubin level severity of progression of heart failure (NYHA class) also increases & is associated with poor prognosis .

**Table 18 :Hyperbilirubinemia in different study groups**

| Study groups | Hyperbilirubinemia (percentage) |
|---|---|
| JayakrishnaChintanaboina et al.(2013) | 70% |
| Scholfield M et al. (2014) | 36.1% |
| Solovera A et al. (2016) | 72% |
| Jeraud M (2019) | 77 % |
| Present study (2020) | 60.86 % |

## V. SUMMARY

In this present study, most common age group affected was found to be in between 61 to 70 years (50/117 cases,42.73%) indicating that advanced age groups is associated with increase incidence of congestive cardiac failure with slight male preponderance (male :female ,1.43:1).

In this study ,most common etiology of congestive cardiac failure was found to be coronary artery disease (44/117 cases,37.6%) followed by rheumatic heart disease (29/117 cases, 24.8%).Least common cause was found to be hypertensive heart disease (11/117 cases,9.4 %).

The present study shows significant changes in liver biochemical abnormalities in patients with congestive cardiac failure. These changes are useful in assessing the severity of heart failure. The present study suggest an early detection of liver function abnormalities in congestive cardiac failure.

In this study, maximum cases with abnormal liver function study was found to be coronary artery disease (32/44 cases,72.7 % ) followed by rheumatic heart disease (19/29 cases,65.5 %). Least percentage of liver function abnormality was found to be associated with hypertensive heart disease 27.2 %.

Out of the different liver function parameter, total serum bilirubin is considered to be the most important biochemical parameter that can predict the prognosis of patient with congestive cardiac failure.

In this present study ,cases with total serum bilirubin value more than 3mg/dl was found to be 28 cases out of 117 cases & value more than 5mg/dl was found to be in 4 cases and all these cases were associated with increased severity of congestive cardiac failure. Total serum bilirubin was found to be abnormal in 71/117 cases (60.86 %).Mean serum bilirubin was found to be increased with increased severity of heart failure according to NYHA classification in which maximum level was seen in class IV NYHA class (16 cases) indicating that increased in total serum bilirubin can adversely affect the outcome in patients with congestive cardiac failure. Elevated AST and ALT were found to be in 63/117 cases(53.85 %0 and 46/117 cases (39.32 % ) respectively. Hypoalbuminemia was found in 35/117 cases (29.91 %) and prolonged prothrombin time was found in 69/117 cases (58.9%).

Cases associated with clinically detectable jaundice was found in 18/117 cases (15.4%), hepatomegaly in 55/117 cases (47.01%) and ascites in 11/117 cases (9.4%).

Severe congestive cardiac failure with hypotension can be associated with increased elevation of serum transaminase level.

## VI. CONCLUSION

Heart failure indeed is a complex disease and so far has been a major cause of mortality and morbidity worldwide. The present study undertaken shows significant changes in liver biochemical profiles in patients with congestive cardiac failure. These changes are found to be useful in assessing the duration and severity of heart failure. Liver perform a diverse array of biochemical ,synthetic and excretory functions ,therefore clinical evaluation ,a complete biochemical profile ,the underlying cause and radiological imaging are necessary to interpret the liver function test. The altered liver function test in congestive cardiac failure patient is often reversible. Serum bilirubin level more than 5 mg/dl at presentation and hypoalbuminemia were associated with adverse outcome in congestive cardiac failure patients.

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