



## Frequency Of Increased Level Of Pro Bnp In Cirrhotic Cardiomyopathy

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**Abstract:** Brain natriuretic peptide (BNP) is a cardiac neuro hormone that is secreted from the ventricles in response to increased diastolic pressure or volume. When cirrhosis is present, the BNP concentrations may be higher. Elevated pro BNP levels are related to the cirrhotic cardiomyopathy. **Objective:** Cross Sectional study to determine the frequency of raised level of pro- BNP in cirrhotic cardiomyopathy. **Duration of study with dates:** Study was carried out over a period of six months from 11-03-2019 to 10-09-2019. **Methods and Materials:** A total of 148 patients were included in the study. After initial assessment a blood sample of 5cc was taken and sent to hospital laboratory for analysis of pro-BNP at admission. Raised pro-BNP was labeled if pro-BNP was >93 pg/ml for men and >144 pg/ml for women. **Results:** Mean age of the patients was 56.8±9.5 years. There were 99 males (66.9%) and 49 females (33.1%). Distribution of Child Pugh Class was as follows: 40 patients (27%) of class-A, were 64 patients (43.2%) of class-B and 44 patients (29.8%). Mean duration of disease was 33.0±11.3 months. Raised proBNP was found in 88 patients (59.5%). Stratification for age, gender, Child Pugh Class and duration of disease was also carried out and there were no statistically significant results. **Conclusion:** In conclusion, the cardiac systolic and diastolic function of patients with cirrhosis are deficient, and diastolic dysfunction is given priority to systolic 3 dysfunction. The cardiac dysfunction confirmed the existence of cirrhotic cardiomyopathy.

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**Key words:** Pro-BNP, Cirrhotic Cardiomyopathy, Liver cirrhosis

### Introduction:

Cirrhosis is a common, disease that may be complicated with multiple organ dysfunctions, including a progressive deterioration of cardiac and renal function [1,2]. Liver cirrhosis is associated with severe hemodynamic changes which include hyperdynamic, circulation with increased cardiac output, heart rate and reduced systemic vascular resistance [3]. Cirrhotic cardiomyopathy designates a cardiac dysfunction, which includes reduced cardiac contractility with systolic and diastolic dysfunction, and presence of electrophysiological abnormalities in particular prolongation of the QT interval [3-5]. Several pathophysiological Mechanisms including reduced beta-receptor, function seems to be involved in the autonomic and cardiac dysfunctions [5,6]. Since the first recognition of cardiac involvement in cirrhosis, all published studies explain that decompensated cirrhotic 5 patients suffer from haemodynamic changes, currently known as hyperdynamic syndrome, which finally lead to cirrhotic cardiomyopathy [7]. It typically manifests during stress, exertion, transjugular intrahepatic portosystemic shunt or liver transplantation [8].

Cirrhotic cardiomyopathy is reported to be most common cause of post-transplant mortality after rejection (7% to 21%) [8] Brain natriuretic peptide is secreted by heart ventricles in response to massive stretching of muscle cells or to mild cardiac damage. Previous studies in cirrhotic patients have demonstrated that BNP and NTproBNP serum levels are significantly elevated and correlate with parameters of cirrhosis severity, abnormal cardiac structure [9]. It was reported that there is increased plasma concentrations of brain natriuretic peptide in some patients with cirrhosis. These findings may suggest cardiac dysfunction. Recently, however, the propeptide of brain natriuretic peptide (proBNP) has been suggested as an even better indicator of early cardiac dysfunction [10,11]. One more study reported 6 that increased pro-BNP levels were seen in 31.2% of cases of Cirrhotic cardiomyopathy [12]. A local study reported increased value of Pro-BNP of 56.8% [13] in cirrhosis. The rationale of this study is to determine frequency of raised levels of pro-BNP in cirrhotic cardiomyopathy. Though a local study is available but the frequency is tot high i.e. 56.8% [13] as compared to a study done on other population i.e. 31.2% [12].

This study will help us to see frequency of raised increased pro-BNP cirrhotic cardiomyopathy. The results of this study can be utilized to assess serum BNP levels as a valuable parameter in predicting the prognosis, and monitoring the response to, therapy in cirrhotic cardiomyopathy.

#### **Objectives:**

Objective of the study was:

- To determine the frequency of raised level of proBNP in cirrhotic cardiomyopathy.

#### **Material and Methods:**

##### **Study design:**

Cross-sectional study.

##### **Setting:**

Department of Gastroenterology, DHQ Teaching Hospital, Gujranwala.

##### **Duration of study with dates:**

Study was carried out over a period of six months from 11-03-2019 to 10-09-2019.

##### **Sample size:**

A total of 148 cases are estimated using increased value of Pro-BNP as 56.8% [13] with 95% confidence level and 8% margin of error.

##### **Sampling technique:**

Non-probability consecutive sampling was used.

##### **Sample selection:**

##### **Inclusion Criteria:**

Aged 18-80 years 58 - Either gender - Diagnosed Cirrhotic cardiomyopathy (as per operational definition)

##### **Exclusion Criteria:**

Valvular heart disease (ECG and Echocardiograph) - Hypertensive cases (BP > 140/90) - Valvular heart disease (ECG and Echocardiograph) - Patients with prior history of myocardial infarction (was assessed through clinical records) - H/O drug intake such as calcium channel blockers, antiarrhythmic, H/O Ethanol.

##### **Data collection procedure:**

A total of 148 cases meeting inclusion criteria were taken in this study after taking a written informed consent. They were enrolled through department of gastroenterology DHQ teaching hospital. Basic information such as age gender and contact details were taken. After initial assessment blood sample of 5cc was taken and sent to hospital laboratory for analysis of pro- BNP at admission. Raised pro-BNP was labelled (as per operational definition). All data was collected by researcher himself and recorded on a prescribed proforma.

##### **Data analysis procedure:**

All collected data were entered and analyzed using SPSS version 20. The qualitative data like gender, raised pro-BNP and Child Pugh Class A, B and C was presented in the form of frequency (%). Quantitative data like age, duration of disease was

presented in the form of mean±S.D. To address effect modifiers data were stratified for age, gender, duration of disease and Child Pugh Class to address effect modifiers. Post stratified Chi-square test was applied by taking p-value ≤0.05 as significance.

#### **Results and Discussion**

Mean age of the patients was 56.8±9.5 years. There were 99 males (66.9%) and 49 females (33.1%). Distribution of Child Pugh Class was as follows: 40 patients (27%) of class-A, were 64 patients (43.2%) of class-B and 44 patients (29.8%). Mean duration of disease was 33.0±11.3 months. Raised proBNP was found in 88 patients (59.5%). Stratification for age, gender, Child Pugh Class and duration of disease was also carried out and there were no statistically significant results.

Cirrhotic patients rarely present symptoms of apparent heart failure; however, some patients develop cardiomyopathy related to cirrhosis. At the beginning of this state we observed hyperkinetic circulation and increased or normal cardiac output; simultaneously, lowered peripheral resistance results in decreased blood pressure. Progressive fibrosis and hypertrophy of the myocardium results in disturbances of LV diastolic function [13]. The cardiovascular system in patients with liver cirrhosis or portal hypertension is abnormal. The circulation becomes hyperdynamic, characterized by increased cardiac output and decreased peripheral vascular resistance and arterial pressure [14]. Moreover, despite the increased cardiac output at rest, with stressful stimuli such as hemorrhage, surgery or vasoactive drug administration, the ventricular 71 response is blunted, a condition known as cirrhotic cardiomyopathy [15]. Looking for an effective index to monitor the cardiac dysfunction in patients with liver cirrhosis has great clinical significance. Brain natriuretic peptide (BNP) is one of the important indicators to the evaluation of cardiac function. Some researches have found that plasma BNP values in patients with liver cirrhosis have close relation with liver function and the cardiac dysfunction, may be one of the potential diagnosis symbols of cirrhotic cardiomyopathy [16]. Pro-brain natriuretic peptide (proBNP) has been recently suggested to be an even better indicator of early cardiac dysfunction than BNP because of its stability and longer biological half-life [17,18,19]. The occurrence of cardiac function abnormalities in cirrhotic patients has drawn a few attentions, although clinical symptoms of cardiac impairment at rest are usually not apparent. By means of echocardiography, 72 some studies carried out a noninvasive assessment of cardiac dimension and systolic and diastolic function in cirrhotic patients at rest and elicited that some morphological and functional parameters may be

taken as early markers of cardiac abnormalities in liver cirrhosis [20]. The natriuretic peptides have recently been highlighted as major markers for the diagnosis, severity, and prognosis of heart failure. B-type natriuretic peptide (BNP) is a neurohormone synthesized in cardiac ventricles. BNP is released as proBNP and then enzymatically cleaved to NT-proBNP and BNP, depending on ventricular myocyte stretching and volume overload. In cases with heart failure, ventricular BNP production is markedly elevated, and circulating BNP concentrations are consistently elevated in untreated heart failure. Accordingly, blood measurements of BNP and proBNP have been found to be of diagnostic value in congestive heart failure (CHF) related to CHF severity. But proBNP has recently been suggested to be an even 73 better marker of early cardiac dysfunction or heart failure than BNP, because it is more stable and less sensitive to rapid fluctuations caused by short-term secretion stimuli due to its longer biological half-life [21]. It was found that the plasma BNP levels in patients with liver cirrhosis have close relationship with liver function and the cardiac dysfunction. In our study, serum proBNP levels were found to be significantly higher in cirrhotic patients than in controls [22,23]. A research by Henriksen showed that circulating proBNP concentrations significantly increased in patients with advanced cirrhosis. However, no signs of reduced proBNP were found in patients with cirrhosis, which suggested that elevated level of proBNP was a marker of cirrhotic severity and predicted the presence of cardiac dysfunction [24]. In present study, raised level of proBNP in cirrhotic cardiomyopathy found in 59.5% of the patients. Our findings are close to the results of Shaikh et al [13], 74 they demonstrated increased value of Pro-BNP as 56.8%. A similar Indian study further emphasized that diastolic dysfunction was present in majority of patients suffering from cirrhosis [25]. A study by Henriksen et al showed that the patients who had ascites had much higher average levels of proBNP than those cirrhotic who were ascites free [26, 27, 28].

### **Conclusion:**

In conclusion, the cardiac systolic and diastolic function of patients with cirrhosis are deficient, and diastolic dysfunction is given priority to systolic dysfunction. The cardiac dysfunction confirmed the existence of cirrhotic cardiomyopathy.

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