

**Original article:**

## **Study of grading of severity of Heart Failure in patients with Dilated Cardiomyopathy**

**Dr Satyajeet Shantaram Nighute \* , Dr Govind S. Shiddapur , Dr Madhulika Mahashaabde ,  
Dr Chintan K. Ranpara , Dr Swapnil B. Shinde**

Department of Medicine, Dr D Y Patil Medical College, Hospital and Research Centre , Pimpri, Pune - 411018

Corresponding author\*

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**Abstract:**

**Introduction:** Cardiomyopathies are classified traditionally according to morphological and functional criteria into four categories: dilated cardiomyopathy (DCM), hypertrophic cardiomyopathy (HCM), restrictive cardiomyopathy (RCM) and arrhythmogenic right ventricular (RV) cardiomyopathy/dysplasia (ARVC/D).

**Material and methods:** The present study was conducted on all newly diagnosed cases of dilated cardiomyopathy coming to the medicine OPD of Padmashree Dr. D. Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune. Established in 1996 College has a 1290 bedded well equipped own hospital, backed by a Research Centre.

**Results:** Pro-BNP levels are shown in the above table. According to it, mean level of pro-BNP among class I heart failure patients was found  $696 \pm 245$  pg/dl, mean level for class II patients was  $871 \pm 305$  pg/dl, mean level for class III patients was  $1874 \pm 618$  pg/dl and mean level for class IV patients was  $2717 \pm 994$  pg/dl.

**Conclusion:** Pro-BNP level is raised in dilated cardiomyopathy. It correlates with level of heart failure in patients with DCM. As the level of pro-BNP increases there is increase in level of cardiac failure in dilated cardiomyopathy.

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**Introduction:**

Cardiomyopathies are classified traditionally according to morphological and functional criteria into four categories: dilated cardiomyopathy (DCM), hypertrophic cardiomyopathy (HCM), restrictive cardiomyopathy (RCM) and arrhythmogenic right ventricular (RV) cardiomyopathy/dysplasia (ARVC/D). DCM is the most common form of heart muscle disease, comprising approximately 60% of all cardiomyopathies and characterized by left ventricular (LV) dilatation and systolic dysfunction. The dilated cardiomyopathy is often assumed as a common pathway of several cardiovascular pathologies.<sup>1</sup>Dilated Cardiomyopathy is characterized

by an enlarged left ventricle with decreased systolic function as measured by left ventricular ejection fraction. Systolic failure is more marked than the frequently accompanying diastolic dysfunction, although the latter may be functionally severe in the setting of marked volume overload.<sup>2</sup>With this background, the present study was planned to study grading of severity of Heart Failure in patients with Dilated Cardiomyopathy.

**Material and methods:**

The present study was conducted on all newly diagnosed cases of dilated cardiomyopathy coming to the medicine OPD of Padmashree Dr. D. Y. Patil Medical College, Hospital and Research Centre,

Pimpri, Pune. Established in 1996 College has a 1290 bedded well equipped own hospital, backed by a Research Centre.

### Study Period

The period of data collection was from July 2014 to September 2016. After collection of data, the data entry forms were checked for their completeness and missing and incomprehensible data was rechecked from the respective participant profile. Data entry was done in MS Excel data sheet. The data cleaning and the retrieval of the missing data were done over a period of one month. The collected data was analyzed over a three month period and the report writing was completed by end of September 2016.

Forty randomly selected newly diagnosed cases of dilated cardiomyopathy who attend the Outdoor Patient Department (OPD) were included in the

study. Patients were included in the study after taking their voluntary informed consent.

### Study subjects:

#### Inclusion criteria

- a. Age >18 Years.
- b. All Patients with Heart Failure confirmed as Dilated Cardiomyopathy on 2D ECHO Cardiographic Studies
- c. Priorly Diagnosed Dilated Cardiomyopathy Patients on treatment presenting with heart failure.

#### Exclusion criteria

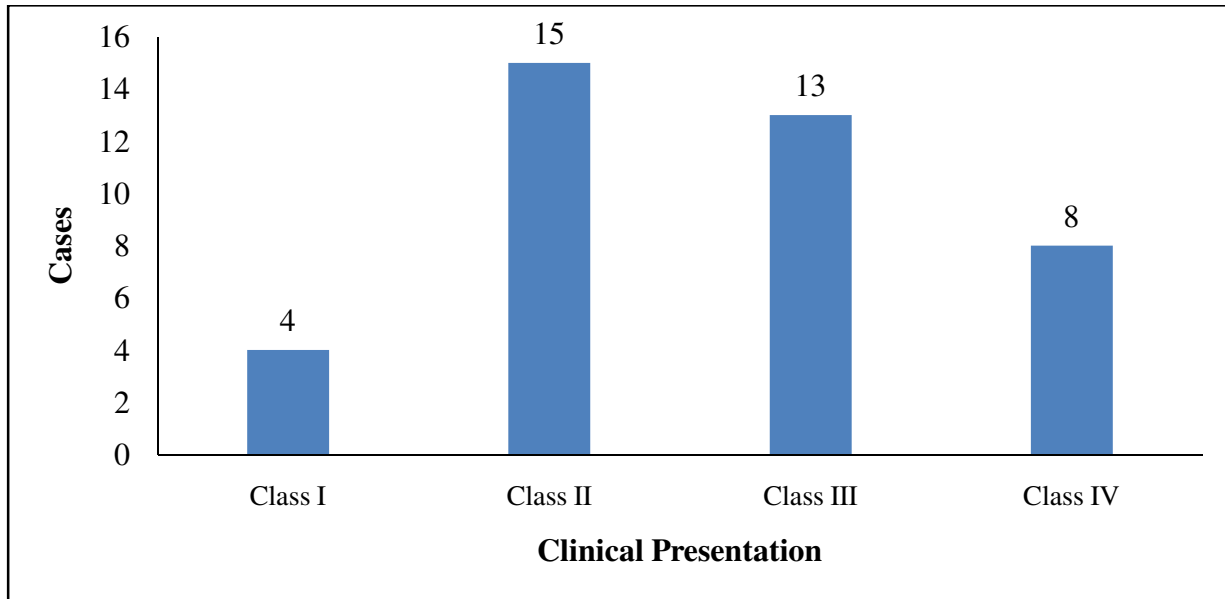
- a. Patients with Acute Myocardial Infarction
- b. Patients with Dilated Cardiomyopathy secondary to Chronic Renal failure
- c. Patients with Valvular Heart Disease.

### Results:

**Table 1 : Distribution of dilated cardiomyopathy patients according to NYHA Class of Heart Failure**

NYHA Class of Heart Failure	Description	Frequency	Percentage
I	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea (shortness of breath).	4	10.0 %
II	Slight limitation of physical activity. Comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea (shortness of breath).	15	37.5 %
III	Marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, or dyspnea.	13	32.5 %
IV	Unable to carry on any physical activity without discomfort. Symptoms of heart failure at rest. If any physical activity is undertaken, discomfort increases.	8	20.0 %

As shown in above table, out of 40 patients of dilated cardiomyopathy, 4 (10.0%) belonged to class I of NYHA heart failure, 15 (37.5%) belonged to class II, 13 (32.5%) belonged to class III and 8 (20.0%) belonged to class IV.



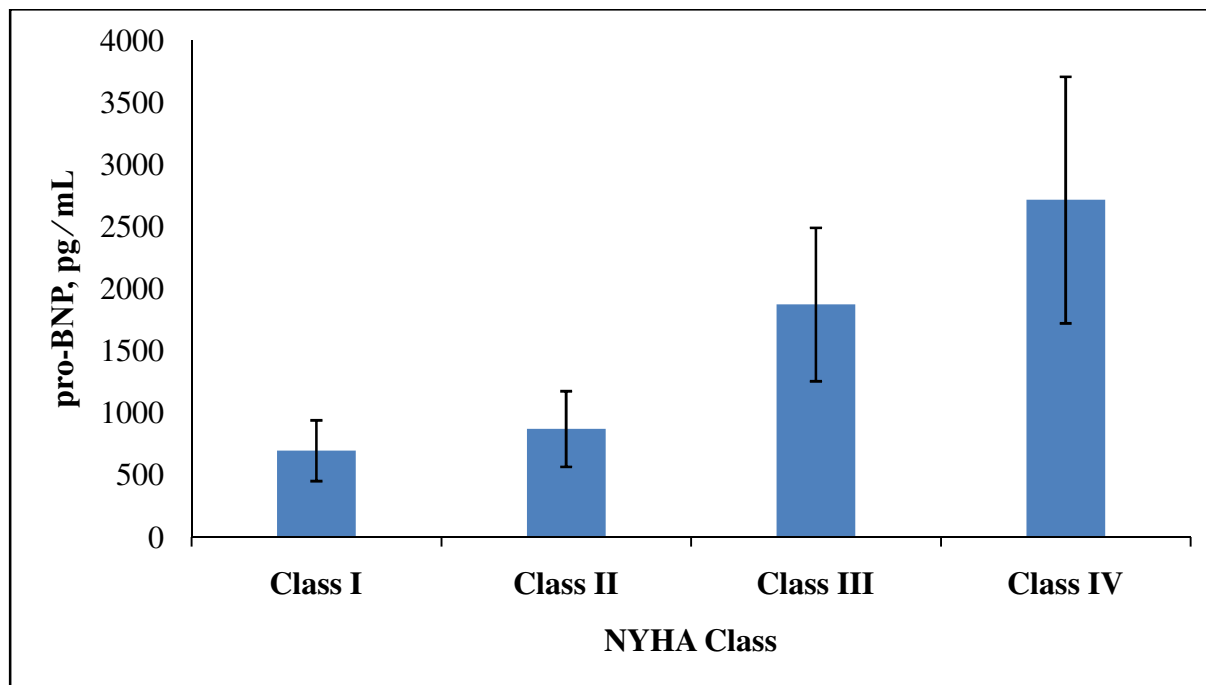
**Figure 15: Distribution of dilated cardiomyopathy patients according to NYHA Class of Heart Failure**

**Table 14: Levels of pro-BNP among patients of dilated cardiomyopathy**

NYHA Class	Cases (n)	pro-BNP, pg/mL (mean±sd)
I	4	696 ± 245
II	15	871 ± 305
III	13	1874 ± 618
IV	8	2717 ± 994

**ANOVA P value <0.001**

Pro-BNP levels are shown in the above table. According to it, mean level of pro-BNP among class I heart failure patients was found 696 ± 245 pg/dl, mean level for class II patients was 871 ± 305 pg/dl, mean level for class III patients was 1874 ± 618 pg/dl and mean level for class IV patients was 2717 ± 994 pg/dl.



**Figure 16: Levels of pro-BNP among patients of dilated cardiomyopathy**

**Discussion:**

Dilated cardiomyopathy is a chronic cardiac muscle disease leading to impairment of the contractile function of the ventricle(s). An aetiological factor is generally not known therefore strictly it should be called idiopathic dilated cardiomyopathy (IDC) but the term often in general use is simply “dilated cardiomyopathy” (DCM).

In the present study, mean level of pro-BNP among class I heart failure patients was found  $696 \pm 245$  pg/dl, mean level for class II patients was  $871 \pm 305$  pg/dl, mean level for class III patients was  $1874 \pm 618$  pg/dl and mean level for class IV patients was  $2717 \pm 994$  pg/dl. In a large study by McDonagh et al in which the authors defined an abnormal proBNP level as one greater than the 95th percentile for patients without LV dysfunction, proBNP levels aided the diagnosis of CHF with a sensitivity of 75% and a negative predictive value of 99%.<sup>3</sup>

Rather than selecting a specific cut-off with optimal performance characteristics, as stated, defined an abnormal proBNP level as one greater than the 95th percentile for patients without LV dysfunction, corrected for age and sex. By using this cutoff strategy, proBNP levels had the abovementioned sensitivity of 75% and negative predictive value of 99% in the diagnosis of CHF. These data confirm the correlation between natriuretic peptide levels and degree of LV dysfunction, using either a BNP or the proBNP assay. Furthermore, subjects with echocardiographically determined LV dysfunction or structural LV heart disease (eg, valvular heart disease), but without clinical CHF exacerbation, have natriuretic peptide levels between those of persons with a normal heart and normal LV function and the levels of patients who have been diagnosed with acute clinical CHF.

Although these studies demonstrated moderate discriminatory power of natriuretic peptide testing in

detecting LV dysfunction, each study revealed substantial overlap in BNP levels between patients with and those without LV dysfunction, symptomatic or not. These results suggest that proBNP might not be useful in screening for CHF or LV dysfunction. However, with appropriate cutoffs and in certain high risk populations, such as patients with dyspnea in the emergency department, BNP and proBNP test characteristics provide sufficient negative predictive value to effectively rule out LV dysfunction.

In the present study, findings of renal function test are shown in the above table. Mean blood urea nitrogen was found  $31.5 \pm 20.3$  mg/dl, serum creatinine was  $1.32 \pm 0.51$  mg/dl, serum uric acid was  $4.6 \pm 1.8$  mg/dl, and serum sodium was  $132 \pm 1.9$  mmol/L. In a similar study, the effect of renal

function on BNP levels was evaluated in 381 ED patients presenting with dyspnea.<sup>4,5</sup> Acute decompensated CHF was diagnosed in only 30%, but a similar inverse relationship was found between estimated GFR and BNP levels. The authors suggested rule out CHF cutoffs of 290 and 515pg/mL for patients with estimated GFR of 6089 and 1529mL/ min, respectively. For proBNP assays, optimal cutoffs were 1360 and 6550pg/mL,

**Conclusion:**

Pro-BNP level is raised in dilated cardiomyopathy. It correlates with level of heart failure in patients with DCM. As the level of pro-BNP increases there is increase in level of cardiac failure in dilated cardiomyopathy.

**References:**

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