ORIGINAL RESEARCH PAPER

General Medicine

CLINICAL PROFILE AND CORRELATION OF SERUM BNP LEVEL AT ADMISSION WITH ICU STAY DURATION IN PATIENTS OF ACUTE DECOMPENSATED HEART FAILURE

KEY WORDS: HF-Heart Failure, BNP-Brain Natriuretic peptide, HTN-Hypertension DM-Diabetes Mellitus, IHD-Ischemic Heart Disease

Dr Sagar Desai DM-Cardiology Assistant Professor,General Medicine Department, S.Nijalingappa Medical College and HSK Hospital,Bagalkot (Karnataka)

Dr Ayush M Patel* Post Graduate Student,General Medicine Department, S.Nijalingappa Medical College and HSK Hospital,Bagalkot (Karnataka) *Corresponding Author

ABSTRACT

BACKGROUNDS: Serum BNP levels have been established for diagnosis of HF in proportion to severity of symptoms, degree of LV dysfunction with other comorbidity and predict morbidity and mortality in HF pts.

Methods: A Case series descriptive study of 50 patients admitted in ICU of HSK Hospital, Bagalkot in duration of 3 months of study period with HF (according to symptoms and LV dysfunction) and perform spot test of serum BNP level(reference value >100pg/ml) and correlate with pts ICU stay duration.

Results: Study comprised of 50 HF pts. In this study mean age of 63 yr pts and their association distribution with BNP level was 1100 pg/ml and 4 days of mean ICU stay by using Pearson Chi-Square test (X2-0.996b). High level of BNP with other comorbities also prolong the duration of ICU stay.

- **Conclusion:** This Study shows that in patients with heart failure, raise BNP level is associated with long ICU stay in hospital. So, it can use as predictor for in hospital treatment. Further this Study shows possibility of associated complications with various comorbidities in heart failure
- patients, who had raised BNP levels. So, it can use as a prognostic indicator.

INTRODUCTION:

- Heart Failure is a "Inefficiency of heart to pump sufficient amount of oxygenated blood to organs to meet metabolic demands and to collect blood from organs".[1] Heart failure is complex clinical syndrome characterized by abnormalities of Left ventricular function and neuro-hormonal regulation.[2] Heart failure is defined by the presence of typical symptoms such as dyspnea, fatigue and/or fluid retention due to cardiac dysfunction. These typical, yet non-specific symptoms can make heart failure difficult to diagnose.[3] Inaccurate emergency diagnosis of elderly patients with acute respiratory failure was shown to be as high in Study Group.[4] These missed diagnoses were associated with highly significant increases in mortality, and highlighted the need for diagnostic tools with high specificity and sensitivity that can be accessed quickly in a busy ED environment.[5]
- Brain Natriuretic Peptide [BNP] exclusively ventricular derived hormone, so failing in ventricular activity stimulates production of more BNP.[6] The brain natriuretic peptide (BNP) gene is activated in cardiomyocytes when myocardial wall stress is increased by an overload of volume or pressure.[7] The resulting precursor peptide (BNP) is cleaved into two parts: active BNP, and inactive N-terminal (NT)-BNP, which are released into the circulation. BNP, as well as various degradation products of BNP, can also be found in the bloodstream.[8] In cases of heart failure, a large increase in the usually low BNP levels occurs, leading to positive downstream effects, including vasorelaxation and natriuresis.[9]
- So, circulating concentration of BNP are increased in heart failure in proportion to severity of symptoms, degree of Left ventricular dysfunction and cardiac filling pressures.[10]

OBJECTIVES OF THE STUDY:

- The goal of this study is to evaluate the clinical profile and explore the correlation between serum BNP levels at presentation at hospital and duration of ICU stay in patients, who presented with heart failure (symptoms and left ventricular dysfunction). MATERIALS AND METHODS:
- **Study design:** A case series descriptive study.
- **Study setting:** ICU of S. N. Medical College and HSK Hospital, Bagalkot (Karnataka).
- Study Period: 3 months (May-July- 2019)
- Study population: All patients admitted in ICU of HSK Hospital.
- Sample size:50

- **Inclusion criteria**

All 50 patients admitted in ICU with heart failure symptoms and left ventricular dysfunction during the study period were included in the study.

- **Exclusion criteria**

Patients with other causes of raised BNP levels like Acute or Chronic renal failure, Chronic obstructive pulmonary disease, Pulmonary embolism, Pneumonia, Sepsis, Liver cirrhosis, Hyperthyroidism were excluded.

- **Statistical Analysis:**

The data obtained was compiled and analyzed using Epi-info version 6.0 with diagnosed accuracy of BNP was evaluated by calculating Pearson Chi-Square test and results were shown in % and tables with 95% confidence interval.

- **RESULTS DISCUSSION:**

Table 1: shows age distribution according to gender

Group	Age	Male	Female	Total	
Cases	26-50	4	4	8	df=3
	51-75	18	21	39	X^2=0.996b
	76-100	1	1	2	P=0.802
	>100	1	0	1	
		24	26	50	
Control	<25	1	0	1	
	26-50	8	7	15	
	51-75	18	11	29	
	76-100	3	2	5	
		30	20	50	
Total		54	46	100	

- Table 1 shows age distribution according to gender.
- In it 50 cases included who admitted with heart failure symptoms with LV dysfunction and 50 controls included who admitted with other symptoms or disease.
- In cases there is no significant variation in gender and belong to age group 51-75 yrs.

Table 2 showing co-morbidities association with groups

Parameter	NO(%)	YES(%)	
HTN-Control	72	28	P<0.663
HTN- Case	68	32	df=1, X^2=0.190a
DM- Control	62	38	P<0.418
DM- Case	54	46	df=1, X^2=0.657a
IHD- Control	92	8	P<0.617
IHD- Case	68	32	df=1, X^2=0.250a

Table 2 shows –Comorbidities like HTN, DM, IHD have significantly association with cases group who are heart failure patients than other group.

Table 3 showing the Mean ± SD and association distribution of Age, BNP and ICU stay.

Parameter	Mean	SD±	
Age- Control	56.42	14.983	P<0.802
Age- Case	63.08	12.227	df=3
BNP- Control	29.46	29.488	X2=0.996b
BNP- Case	1112.98	1252.652	
ICU Stay - Control	2.20	0.881	
ICU Stay- Case	4.16	1.963	

Table 3 shows – Mean value of both study groups with parameters like Age, BNP, ICU stay duration.

In Cases it shows significant elevation in BNP value and also ICU duration prolongation compare with control group.

Table 4 shows-Clinical profile and correlation of BNP level and ICU stay

BNP Level [pg/ml]	Total Cases	Associated co-morbidity	Duration of ICU Stay in days[Mean]	Complications
101-200	12	4	2	0
201-500	10	4	2.5	0
501-1000	11	5	4	1
1000-2000	9	7	5.5	3[1 case death]
>2000	8	7	7	5[3 case death]

- Study shows significant rise in BNP level leads to prolong ICU stay as well as increased risk of complications [including death].
- This study also suggestive of significant association between comorbidities and complications as well as direct correlation with Raised BNP level and ICU stay duration.
- Result of the present study indicates the BNP level at admission predict the ICU stay duration and in-hospital complications of heart failure patients.
- Previous reference study shows frequent changes in BNP level during hospitalization due to therapy[treatment] and monitoring of BNP gives proper clue about morbidity and mortality.so it can consider a limitation for present study.

CONCLUSION:

- This Study shows that in patients with heart
- failure, raise BNP level is associated with long ICU stay in hospital. So, it can use as predictor for in hospital treatment.
- Further this Study shows possibility of associated complications with various co-morbidities in heart failure patients who had raise BNP levels. So it can use as a prognostic indicator.

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