ISSN: 0975-3583, 0976-2833 VOL14, ISSUE04, 2023

Original Research Article

To study the Correlation of NT Pro BNP levels with age, gender, body mass index and troponin.

Dr. Ashish Chauhan[1] (Senior Intervention Cardiologist)

DNB, DM (Cardiology), FSCAI (USA), BIMR, Gwalior, M.P.[1]

Corresponding Author: Dr. Ashish Chauhan

ABSTRACT

Background & Methods: The aim of the study is to study the Correlation of NT Pro BNP levels with age, gender, body mass index and troponin. Cases of Congestive Cardiac failure admitted to Intesive Care Unit (ICU)/ Intensive Cardiac Care Unit (ICCU),were subjected for history and clinical examination For use in the calibration of the VITROS.

Results: There is no correlation of NT Pro BNP levels with age p value =0.271 (>0.05) of the patients in the study and control group. Out of thirty cases of control group, maximum thirteen (43.33%) were in the sixth and seventh decades out of which eight males and five females. Out of nine (30%) cases of fourth and fifth decades, there were four males and five females. In eighth and ninth decades, there were only eight (26.67%) cases out of which five males and three females. There is no correlation of NT Pro BNP levels with Gender – p value = 0.134 (>0.05) of the patients in the study and control group. There is significant correlation of NT Pro BNP levels with Troponin - p value = 0.032 (<0.05) of the patients in the study and control group.

Conclusion: In control group nine (30%), thirteen (43.33%) and eight (26.67%) cases were in fourth and fifth, sixth and seventh and eighth and ninth decades respectively. Out of thirty Cases of Control Group, seventeen (56.67%) were males and thirteen (43.33%) females. Mean and standard deviation of age of the cases of control group 60.87±14.15 years. The Male: Female ratio in control group was M: F = 1.30: 1.

Out of one hundred cases of study group, seventy three (73%) were having BMI >25 kg/m². Out of thirty cases of control group, twenty six (86.66%) had BMI <25 kg/m². Mean and standard deviation of BMI of study group cases: 27.17± 4.06 Kg/m² and that of control group was 23.46±2.59 kg/m². There is significant correlation of NT Pro BNP levels with BMI - p value <0.001 of the patients in the study and control group.

Keywords: Correlation, NT Pro BNP & troponin.

Study Design: Comparative Study.

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Introduction

Heart failure is a complex clinical syndrome that results from structural or functional impairment of ventricular filling or ejection of blood, which in turn leads to the cardinal symptoms of dyspnea and fatigue and signs edema and rales that lead to frequent hospitalizations, a poor quality of life, and a shortened life expectancy[1].
Heart failure (HF) may be right sided or left sided (or both).Patients with left heart failure have symptoms of low cardiac output and elevated pulmonary venous pressure; dyspnea is the predominant feature. Signs of fluid retention predominate in right heart failure. Most patients exhibit symptoms or signs of both right- and left-sided failure, and LV dysfunction is the primary cause of RV failure[2]. Approximately half of patients with heart failure have preserved systolic function, in large part due to diastolic dysfunction, experience many of the same symptoms and may be difficult to distinguish clinically[3]. Elevated diastolic pressures are transmitted to the pulmonary and systemic venous systems, resulting in dyspnea and edema[4]. The most frequent cause of diastolic cardiac dysfunction is LVH, commonly resulting from hypertension, but conditions such as hypertrophic or restrictive cardiomyopathy, diabetes, and pericardial disease can produce the same clinical picture. In developed countries, CAD with resulting myocardial infarction and loss of functioning myocardium (ischemic cardiomyopathy) is the most common cause of systolic heart failure. Systemic hypertension remains an important cause of CHF and, even more commonly in the United States, an exacerbating factor in patients with cardiac dysfunction due to other causes such as CAD[5].

Nevertheless, we propose that the incidence and prevalence rates of heart failure are rising due to population, epidemiological and health transitions. Based on disease-specific estimates of prevalence and incidence rates of heart failure, we conservatively estimate the prevalence of heart failure in India due to coronary heart disease, hypertension, obesity, diabetes and rheumatic heart disease to range from 1.3 to 4.6 million, with an annual incidence of 0.4–1.8 million. The double burden of rising cardiovascular risk factors and persistent _pre-transition‘ diseases such as rheumatic heart disease, limited healthcare infrastructure and social disparities contribute to these estimates. Staging of heart failure, provides a framework to target preventive strategies in patients at risk for heart failure (stage A), with structural disease alone (B), with heart failure symptoms (C) and with end-stage disease (D). Policy-level interventions, such as regulations to limit salt and tobacco consumption, are effective for primordial prevention and would have a wider impact on prevention of heart failure. Clinical preventive interventions and clinical quality improvement interventions, such as treatment of hypertension, atherosclerotic disease, diabetes and acute decompensated heart failure are effective for primary, secondary and even tertiary prevention[6].

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1. Material and Methods

The present study to study the Correlation of NT Pro BNP levels with age, gender, body mass index and troponin was conducted at Tertiary Care Centre for 01 Year on 130 Patients (100 Cases & 30 Controls).
Cases of Congestive Cardiac failure admitted to Intesive Care Unit (ICU)/ Intensive Cardiac Care Unit (ICCU),were subjected for history and clinical examination For use in the calibration of the VITROS ECi/ECiQ Immunodiagnostic Systems, the VITROS 3600 Immunodiagnostic Systems and the VITROS 5600 Integrated System for the quantitative measurement of N-terminal pro Brain Natriuretic Peptide (NT-pro BNP) in human serum AND PLASMA (EDTA or heparin)

Inclusion Criteria:
All patients admitted in Hospital, diagnosed as congestive cardiac failure as per Framingham Criteria in the age group of 30-90 years with written consent for participation were included in the study.

2. Result

Table No. 1: AGEWISE GENDER DISTRIBUTION OF CASES IN STUDY AND CONTROL GROUPS

	Case			**Control**		
Age Group in Years	**No. of cases (%)**	**Male (%)**	**Female (%)**	**No. of cases (%)**	**Male (%)**	**Female (%)**
31-50	29 (29%)	16 (16%)	13 (13%)	09 (27%)	04 (13.33%)	05 (16.66%)
51-70	53 (53%)	32 (32%)	21 (21%)	13 (39%)	08 (26.66%)	05 (16.66%)
71-90	18 (18%)	11 (11%)	07 (07%)	08 (24%)	05 (16.66%)	03 (10.00%)
TOTAL	100 (100%)	59 (59%)	41 (41%)	30 (100%)	17 (56.65%)	13 (43.35%)

	NT PRO BNP		**Total**	P value
AGE	30-50	09	36	0.271
GROUP	51-70	13	49	
	71-90	09	14	

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There is no correlation of NT Pro BNP levels with age p value =0.271 (>0.05) of the patients in the study and control group.

TABLE 2: GENDER DISTRIBUTION IN STUDY AND CONTROL GROUPS

GENDER	Case		Control	
	No of Cases	Percentage (%)	No of Cases	Percentage (%)
MALES	59	59	17	56.67
FEMALES	41	41	13	43.33
TOTAL	100	100	30	100

		NT PRO BNP			
		<400	≥400	Total	P Value
GENDER	FEMALE	14	34	48	0.134
	MALE	17	65	82	

Out of one hundred study cases, maximum fifty three (53%) were in the sixth and seventh decades and among them thirty two males and twenty one females. Out of twenty nine (29%) cases of fourth and fifth decades, there were sixteen males and thirteen females. In eighth and ninth decades, there were only eighteen (18%) cases in which eleven males and seven females.

Out of thirty cases of control group, maximum thirteen (43.33%) were in the sixth and seventh decades out of which eight males and five females. Out of nine (30%) cases of fourth and fifth decades, there were four males and five females. In eighth and ninth decades, there were only eight (26.67%) cases out of which five males and three females. There is no correlation of NT Pro BNP levels with Gender – p value = 0.134 (>0.05) of the patients in the study and control group.

TABLE 3: BODY MASS INDEX OF CASES IN STUDY AND CONTROL GROUPS:

BMI(Kg/m^2)	Case	No. of cases	Control	No. of cases
<25	27	27.00%	26	86.66%
25-29.9	65	22.00%	03	10.00%
≥30	08	05.00%	01	03.34%
TOTAL	100	100.00%	30	100.00%

		NT PRO BNP			P VALUE
		<400	≥400	TOTAL	
BMI	<25	24	29	53	0.000
	≥25	7	70	77	

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Out of one hundred study cases, maximum sixty five (65%) cases were having BMI between 25-29.9 kg/m², twenty seven (27%) <25 kg/m², and only eight (8%) cases >30 kg/m² . Out of thirty cases of control group, twenty six (86.66%) had BMI <25 kg/m² and three (10%) ranging from 25-29.9 kg/m² however only one (03.34%) case had BMI >30 kg/m². Mean and standard deviation of BMI of study group cases was 27.17± 4.06 Kg/m². and that of control group 23.46±2.59 kg/m².

There is significant correlation of NT Pro BNP levels with BMI - p value <0.001 of the patients in the study and control group.

TABLE 4: CORRELATION BETWEEN NT PRO BNP WITH TROPONIN:

	TROPONIN	
NT PRO BNP	**NEGATIVE**	**POSITIVE**
<400	04	00
≥400	81	15

		NT PRO BNP			**P VALUE**
		<400	**≥400**	**TOTAL**	
TROPONIN	**NEGATIVE**	31	84	115	0.032
	POSITIVE	00	15	15	
	Total	31	99	130	

There is significant correlation of NT Pro BNP levels with Troponin - p value = 0.032 (<0.05) of the patients in the study and control group.

3. Discussion

The patients of the study had multiple cardiovascular risk factors such as hypertension, smoking, diabetes mellitus, dyslipidemia and family history, while significant number of them had coronary heart disease. According to coronary angiography findings many of them had diffuse coronary heart disease so they underwent a reperfusion therapy.

ProBNP levels in patients with ACS in our study increased very early while the maximum levels were observed in the first 48 hours. Previous studies showed this results too[7]. Brain peptide (BNP) releases instantly after myocardial infarction reaching the peak after 16 hours. The mechanism of increasing ProBNP in patients with ACS and normal ejection fraction is not known yet. Probably the myocardial cells release natriuretic peptides during a long ischaemia period before myocardial necrosis[8-9]. Thus, ischaemia is probably an additional factor of releasing ProBNP, as illustrated by the results of this study.

Out of one hundred cases of study group, seventy three (73%) were having BMI >25 kg/m². Out of thirty cases of control group, twenty six (86.66%) had BMI <25 kg/m². Mean and standard deviation of BMI of study group cases: 27.17± 4.06 Kg/m² and that of control group was 23.46±2.59 kg/m².

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However Jahangir Liquat et al in 2009 obtained somewhat higher mean BMI 30.1±6.3 kg/m² but the observations of mean BMI 27±15 kg/m² obtained in COACH study from 2002 to 2005, was consistent with that obtained in the present study[10].
Out of one hundred cases of study group, seventy three (73%) were having BMI >25 kg/m². Out of thirty cases of control group, twenty six (86.66%) had BMI <25 kg/m². Mean and standard deviation of BMI of study group cases: 27.17± 4.06 Kg/m² and that of control group was 23.46±2.59 kg/m².
However Jahangir Liquat et al [11] in 2009 obtained somewhat higher mean BMI 30.1±6.3 kg/m² but the observations of mean BMI 27±15 kg/m² obtained in COACH study from 2002 to 2005, was consistent with that obtained in the present study.
PRIDE study by Januzzi et al [1] while that obtained in the present study it was 282.83pg/ml.
Newby et al. stress that the problem with troponin testing, like any laboratory test, is inappropriate testing (when not indicated) or inappropriate interpretation of results, not the marker itself, and that clinicians should only test for troponin when appropriate (i.e., clinically indicated). In patients with non-ST elevation ACS, global risk assessment rather than any single marker should be used for diagnosis and to guide therapy.
Therefore, to directly compare the utility of troponin testing in CKD and non-CKD populations, the pre-test probabilities should be similar in order to draw conclusions about comparisons[12]. Although we found no studies that directly compared the use of troponin for diagnosing ACS in CKD versus non-CKD in the same population, our indirect comparison does not suggest that troponin is less effective in diagnosing ACS in CKD.

4. Conclusion

In control group nine (30%) , thirteen (43.33%) and eight (26.67%) cases were in fourth and fifth, sixth and seventh and eighth and ninth decades respectively. Out of thirty Cases of Control Group, seventeen (56.67%) were males and thirteen (43.33%) females. Mean and standard deviation of age of the cases of control group 60.87±14.15 years. The Male: Female ratio in control group was M: F = 1.30: 1.
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