Original Article

Demographic Characteristics of Patients Presented with Acute Heart Failure in ST-Elevation Myocardial Infarction

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Abstract

Background: Acute Heart Failure in ST-Elevation Myocardial Infarction can occur in different age and gender. **Objective:** The purpose of the present study was to see the demographic characteristics of patients presented with acute heart failure in ST-elevation myocardial infarction. **Methodology:** This case-control study was conducted in the Department of Cardiology at National Institute of Cardiovascular Diseases, Dhaka, Bangladesh from February 2007 to July 2007. The patients admitted in the NICVD with ST-elevation acute myocardial infraction (STEMI) during study period were selected as study population. Patients presented with acute heart failure and patients developed acute heart failure within 24 hours of hospital admission were designed as case group. Patients with no feature of heart failure within 24 hours of hospital admission were designed as control group. **Results:** A total 186 patients with acute ST-elevation myocardial infarction were screened. Among them 60 patients were finally selected for this study. Of whom 30 were cases (patients with acute heart failure) and 30 were control (patients without heart failure). Patients needed severe cardiac massage and/or underwent DC shock at admission or before collection of blood sample for BNP testing were also excluded. About 70.0% of the cases and 60.0% of the controls were aged more than 50 years. About 80.0% cases of the subjects, both cases and control, were male and rests 20.0% cases were females. Male and female ratio was 4:1. **Conclusion:** In conclusion most of the patients are in the elder age group and male gender. *[Journal of National Institute of Neurosciences Bangladesh, July 2022;8(2):126-129]*

Keywords: Demographic characteristics; Acute Heart Failure; ST-Elevation; myocardial infarction

Introduction

Heart failure is a common clinical disorder and its incidence is increasing day by day[1]. Being the final common pathway of many types of heart disease, heart failure has a poor prognosis and relapse and repeated hospitalization are both common and costly. A huge harden of heart failure is related to hospital care[2].

Heart failure may be defined as the pathological state in which an abnormality of cardiac function is responsible for the mobility of the heart to pump blood at a rate

commensurate with the requirement of metabolizing tissue and/or can do so only from abnormally related ventricular diastolic volume[3]. The most common cause of heart failure is ischemic heart disease. Due to improvement in the diagnosis and therapy with acute coronary syndrome, more patients are now surviving from myocardial infarction than in previous decades. As a consequence the incidence of heart failure has dramatically increased[4].

In Bangladesh, a study in National Institute of Cardiovascular Diseases (NICVD), Dhaka showed that the commonest cause of heart failure is ischemic heart disease (44.97%) followed by hypertension (22.96%) and valvular heart disease (21%)[5]. Acute heart failure is a common complication of acute myocardial infarction (AMI). Perhaps, one third of patients with AMI develop heart failure within 48 hours. Heart failure develops when LV function is reduced by 30 percent or more of normal. Some compromise of cardiac function is associated with perhaps more than two-thirds of the cases of STEMI and is usually transient. The severity of heart failure, its duration and whether it is reversible or not are predominantly depends on infract size[6]. The purpose of the present study was to see the demographic characteristics of patients presented with acute heart failure in ST-elevation myocardial infarction.

Methodology

Study Settings & Population: This was designed as prospective, case control study. The study was conducted in the Department of Cardiology, National Institute of Cardiovascular Diseases, Sher-e-Bangla Nagar, Dhaka, Bangladesh. The study was carried out from February 2007 to July 2007. Patients admitted in the NICVD with ST-elevation acute myocardial infraction (STEMI) during study period. Among total study population 60 patients with STEMI were selected following the inclusion and exclusion criteria, of which 30 patients had acute heart failure and 30 patients without heart failure. This study protocol was presented before and approved by the institutional review board. Informed verbal consent was obtained from each patient or from the legal guardian of the patient. Ethical approval was sought and received. Patients admitted in NICVD with ST-segment elevation AMI. Patients presented with acute heart failure and patients developed acute heart failure within 24 hours of hospital admission were designed as case group. Patients with no feature of heart failure within 24 hours of hospital admission were designed as control group. Patients who were presented with NSTEMI, Old MI,

Re-infarction, Bundle branch block and CHB, Cardiomyopathy, Congenital heart disease, valvular heart disease, End stage renal failure, Thyrotoxicosis, Cirrhosis of liver, Concurrent malignancy or Pregnancy were excluded from this study.

Study Procedure: Patients who fulfill the inclusion and exclusion criteria were selected as study population. Informed verbal consent was taken from each patient or from their legal guardian who willingly participated in the study. History, Demographic characteristics, findings of clinical examination, risk factors and needed investigations were recorded in the structured questionnaire. 12-lead ECG was done for each patient and serial ECGs were done and observed in relevant cases for the confirmation of STEMI. Acute heart failure was diagnosed on the basis of clinical symptoms of acute heart failure in the form of acute dyspnea and/or crepitation at the lung bases. Two cardiologists reviewed the patients and were agreed on the diagnosis and severity of acute heart failure according to Killip classification. 2D, M-mode and Doppler echocardiography was done to observe the systolic and diastolic dysfunction and regional wall motion abnormality. Left ventricular ejection fraction <50% was chosen as the main cut off value for LV systolic dysfunction according to the criteria of European Society of Cardiology.

Statistical Analysis: Statistical analysis was performed by Windows based software named as Statistical Package for Social Science (SPSS), versions 22.0 (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Continuous data were expressed as mean, standard deviation, minimum and maximum. Categorical data were summarized in terms of frequency counts and percentages. Chi-square test was used for comparison of categorical variables and Student t test was applied for continuous variables. Every efforts were made to obtain missing data. A two-sided P value of less than 0.05 was considered to indicate statistical significance. Differences between case and control were tested.

Results

A total 186 patients with acute ST-elevation myocardial infarction were screened. Among them 60 patients were finally selected for this study. Of whom 30 were cases (patients with acute heart failure) and 30 were control (patients without heart failure). Patients who developed primary VT or VF and complicated with ventricular septal rupture (VSR) or mitral regurgitation (MR) more than grade 1 at the time of admission were excluded

from the study. Patients needed severe cardiac massage and/or underwent DC shock at admission or before collection of blood sample for BNP testing were also excluded. About 70% of the cases and 60% of the controls were aged more than 50 years (Table 1).

Table 1: Distribution of subjects by age group (n=60)

Age Group	Case(n=30)	Control(n=30)	P Value
>50 years	21 (70%)	18 (60%)	0.610ns
<50 years	9 (30%)	12 (40%)	

About 80.0% cases of the subjects, both cases and control, were male and rests 20.0% cases were females. Male and female ratio was 4:1. As differences among the groups were not statically significant so, they were almost identical in terms of both age and sex (p>0.05) (Table 2).

Table 2: Distribution of subjects by sex (n=60)

Sex	Case(n=30)	Control(n=30)	P Value
Male	24 (80%)	24 (80%)	1.000ns
Female	6 (20%)	6 (20%)	

Chi-square Test was done to analyze the data; ns= not significant; n= Total number of subjects.

Discussion

BNP has significant independent predictive power to other clinical variables to diagnose congestive heart failure[2]. The diagnostic value of BNP and NT-pro BNP is well established in patients with suspected heart failure. The European society of cardiology has included the use of natriuretic peptide (BNP) testing in their guidelines for diagnosis or rule out of heart failure. B-type natriuretic peptide with a cut off value of 100 pg per ml has sensitivity of 90.0%, a specificity of 76.0% and accuracy of 83.0% for differentiating congestive heart failure from other causes of dyspnoea[5].

Plasma BNP concentrations are higher in patients with more severe symptoms and in those with more severe cardiac damage and levels of BNP has shown to be elevated in patients with left ventricular dysfunction and correlate with the New York Heart Association (NYHA) class as well as prognosis[6]. Natriuretic peptides are also helpful for guidance of therapy and monitoring disease course in heart failure patients and for risk stratification in heart failure and myocardial infarction.

Circulating concentration of plasma BNP and other cardiac neurohormones increase with acute myocardial infarction (AMI). The extent of the increase is related to the infract size. Patients with smaller infracts tend to have a mono phasic increase in plasma BNP, peaking at

20 hours after the onset of symptoms[7]. On the other hand those with larger infracts, lower EF, and clinical signs of heart failure may present an additional peak at 5 days after admission[8]. BNP seems to provide additional independent prognostic information in the entire spectrum of acute coronary syndromes ST- elevation and non-ST-elevation infarctions as well as unstable angina pectoris at the cutoff point at the median of 80 pg/mL[9].

However, in patients with acute heart failure BNP has been shown to be an independent predictor of cardiovascular mortality and is also predictive of outcome patients with decompensate heart failure[10]. It has been also showed that plasma BNP on admission was higher in patients with subsequent adverse events than in the others. High level of natriuretic peptides at admission strongly predicts likelihood for short term mortality in subjects with acute heart failure[11].

In recent decades BNP has been emerging as a reliable marker of heart failure and used as a rapid test for the diagnosis and prognosis of heart failure and acute coronary syndrome[11]. However BNP test is relatively new in our country and can only be measured in specialized laboratory which has hampered its use on daily practice.

Conclusion

In conclusion most of the patients are in the younger adult age group. It has been found that male gender is found times more prevalent than female. Further large scale study should be carried out to get the real scenario.

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