Original Research Article

Clinical and etiological profile of acute heart failure: an observational study

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ABSTRACT

Background: Acute heart failure (AHF) is a common and growing medical problem associated with major morbidity and mortality. It is the leading reason for hospital admission among patients over age 65 years. Not much of data is available from India, there are a lot of differences between the western data and available Indian data. Prompt diagnosis, identification of reversible causes and supportive management in ICU is of paramount importance.
Methods: This study was conducted at Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore, Karnataka after the institutional ethics committee approval. Those patients who were diagnosed to have AHF, were evaluated and treated as per the institution protocols in ICU and standard medical care which includes diuretics, inotropes and vasopressors. All the patients were prospectively studied; investigated for the etiology of AHF.
Results: Majority of patients presenting as Acute Heart Failure are of 60 years mean age, with 63% males. Ischemic heart disease is the leading cause of Acute Heart Failure. Shortness of breath was the commonest presentation followed by crackles. Abdominal pain was the most common (28%) non cardiac symptom. There is no significant correlation between the presence of anemia and mortality. Hyponatremia had relation with mortality. 22% had HFpEF, rest had HFrEF. The mean hospital stay was 8.3 days. The study mortality was 9 % and the 30-day mortality was 13 % in our study.
Conclusions: Current available data from Indian studies and registries has a lot of difference from the western data with regards to causes, response to treatment, and more such data is needed to frame regional guidelines for better understanding of presentation of heart failure ,treatment and risk factors for mortality.

Keywords: Acute heart failure, Mortality, N-terminal pro b-type natriuretic peptide, Risk factors

INTRODUCTION

Acute heart failure (HF) is the most common diagnosis at discharge in patients aged >65 years. It carries a dismal prognosis in hospital with mortality rate of 3-8%, a 60-90 day mortality rate of 9-13%, and a short-term re-hospitalization rate of 25-30%.[1-3]

The causes are multifactorial. It may occur as a decompensation of chronic congestive heart failure or may occur as de novo onset. The latter subgroup presents both a diagnostic and therapeutic challenge for the treating physician. Prompt diagnosis, identification of reversible causes and supportive management in ICU is of paramount importance.

The European Society of Cardiology defines AHF as the rapid onset of symptoms and signs secondary to abnormal cardiac function.[4] The clinical classification of patients with AHF continues to evolve and reflects ongoing changes in the understanding of the pathophysiology of the syndrome.[5] AHF outcomes remain poor. Prevalence

of in-hospital mortality as high as 10% and prevalence of re-hospitalization >50% within 1 year have been reported.[6]

There has been very little data on the etiology, demographics, risk factors for mortality in the setting of acute heart failure in Indian scenario. Guidelines, we follow are borrowed from the western world, where patients differ grossly from the Indian subset. There is a necessity to have one's own registry to frame local guidelines based on the patterns of presentation and response to treatment.

METHODS

This study was conducted at Sri Jayadeva Institute of Cardiovascular Sciences, Bangalore, Karnataka, after the institutional ethics committee approval. 100 patients admitted to the department of cardiology, who are above 18 years of age with a diagnosis of denovo heart failure by Framingham's criteria, excluding acute decompensation of known heart failure between January 2018 to December 2018 were included. The collected data included epidemiological information (age, sex, occupation, and place), questionnaires for risk factor evaluation (alcohol, HTN, Diabetes mellitus, IHD), information of clinical presentation (Dyspnea, chest pain, edema, oliguria etc.) and clinical signs. Those patients had diagnosed AHF, were treated as per the institution protocols in ICU and standard medical care which includes diuretics, inotropes and vasopressors. All the patients were prospectively studied; investigated for the aetiology of AHF. All patients underwent ECG, Echocardiography, Chest X ray, patients presenting with ACS underwent CAG, Troponin T, NT Pro BNP, Complete blood counts, Renal function test, Liver function test, Serum electrolytes. All those patients whose renal function tests were abnormal, were analysed for BUN, nephrologist consultation was taken and dialysis initiated (HD /PD) as per the patient factors and metabolic profile.

Worsening renal function (WRF) was defined as elevation of serum creatinine of more than 0.3 mg/dl from baseline or a rise of more than 25% over baseline during the course of hospital stay.

NT pro BNP level was analysed in all the cases on the day of admission, and the patients were divided into four quartiles based on the value and subgroups analyzed.

- Quartile1 - < 1000pg/ml.
- Quartile 2 - 1000 - 2000 pg/ml.
- Quartile 3 - 2000 - 5000 pg/ml.
- Quartile 4 - >5000pg/ml.

Inclusion criteria

- Patients above 18 years and both males and females were included.

- Diagnosed to have AHF by the Framingham criteria.

Exclusion criteria

Acute decompensation of chronic congestive heart failure.

Statistical analysis

All the data was collected, tabulated and checked for correctness and consistency. Continuous data were represented as mean (SD), categorical data as frequency and percentages. All data was analyzed at the end of the study with a student t test and Chi-square test using SPSS software, p value <0.05 was considered as statistically significant.

RESULTS

Data of 100 patients who were admitted to the department of Cardiology, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore with the diagnosis of denovo heart failure from January 2018 to December 2018 were analysed. Out of 100 patients 63 (63%) were male and 37 (37%) were female. Mean age of presentation is 60. Age distribution of the patients are given in (Table 1) and the various causes of heart failure are listed in (Table 2).

Table 1: Age distribution.

Age in years	No of patients	Percentage
20-30	7	7
31-40	9	9
41-50	18	18
51-60	32	32
61-70	28	28
>70	6	6

Table 2: Causes of acute heart failure.

Etiology	Number of subjects (N=100)
Acute coronary syndrome	41
Idiopathic DCM	17
CKD	13
RHD	13
Peripartum	8
Post chemotherapy	5
Myocarditis	2
LA myxoma	1

Ischaemic heart disease is most common cause of heart failure followed by idiopathic dilated cardiomyopathy. Shortness of breath was the commonest presentation followed by crackles. Among the various non cardiac symptoms at presentation, abdominal pain was the most

common (28%), the next common non cardiac symptom was oliguria seen in 26%.

In the present study majority of the patients were in the NYHA class 4 followed by NYHA class 3 in the descending order. NYHA class 4 was associated with higher mortality. In this study, both high heart rates and low SBP were associated with high mortality, but it was not statistically significant.

Anemia at presentation in AHF was seen in 38% of the study population. There is no significant correlation between the presence of anemia and mortality in the present study. Hyponatremia was seen in 29 patients (29%) in the study. There was also high mortality (25%) in the subgroup who presented with hyponatremia than those who presented with serum sodium >135 mmol/l.

BUN was elevated >40 mg/dl in 23% and serum creatinine was >2 mg/dl in 16% of the patients. The most common RFT pattern overall was that of a prerenal AKI. Both elevated BUN and creatinine were associated with high mortality in this study which was found to be statistically significant for creatinine but insignificant for BUN. Worsening renal function during hospital stay was observed in 28 % of the patients. Mean duration of hospital stay was longer (14 days) in this subgroup compared to those who didn't develop this complication. The mortality was also higher in this subgroup, but it was not statistically significant.

NT pro BNP- In HFrEF subgroup (n=78), majority of the patients n=31 (40%) were in the second quartile (1000 - 2000 pg/ml). Mortality was higher (25%) in the third quartile (n=20) (2000-5000 pg/ml). In HFpEF subgroup (n=22), most of patients n=8 (36%) were in the fourth quartile (>5000 pg/ml). The only death that occurred in the HFpEF group was in the fourth quartile (>5000pg/ml). Higher levels of NT proBNP are associated with more severe symptoms at presentation, i.e higher the NYHA class.

The most common abnormality in ECG was sinus tachycardia. In this study ACS is the most common cause of AHF, in 41 patients . Within the subgroup of patients with ACS presenting with AHF, STE ACSn=28(68%) was more common than the NSTE ACS n=13(32%).

In this study elevated liver enzymes were seen in 58%. The most common pattern was that of mild conjugated hyperbilirubinemia along with elevation of SGOT more than SGPT. Compared to those with normal liver enzymes, subgroup with elevated liver enzymes had a prolonged hospital stay (11 days) versus 8 days in patients with normal liver enzymes, but it was not statistically significant. There was no association with mortality. Based on the EF (systolic function) of HF, the two subtypes HFrEF (78%) and HFpEF (22%) were seen in the study population.

HFpEF was more often associated with shorter duration of hospital stay. Among the various etiologies for HFrEF, longer hospital stays were seen in idiopathic Dilated cardiomyopathy and peripartum cardiomyopathy. In this study there was no correlation between the E/e ratio and mortality, and no correlation was found between the ratio and level of NT proBNP.

The mean hospital stay was 8.3 days in this study. The longest hospital stay was 15 days and the shortest stay was 5 days. In the present study mortality was 9 %. Among the 9 deaths, one occurred in the HFpEF group, whereas other 8 deaths occurred in the HFrEF group. 30-day mortality was 13 % in this study.

DISCUSSION

There is very little available data about Acute Heart Failure in India like The Trivandrum Heart Failure Registry.[7] When Indian data was compared with western studies like ADHERE, OPTIMIZE, it was shown that there are many differences in the way of presentation to risk factors of mortality to response to treatment.[8,9]

In ADHERE and OPTIMIZE, 52% of study population were females and 48% were males compared to Trivandrum registry showing 31% females and 69% males. Study had 37% females, showed similar ratio as Trivandrum registry.

ADHERE has 72.4 years as the mean age of presentation, OPTIMIZE has mean age as 73 years, ESC HF Pilot study performed in Europe has a mean age of presentation as 70 years. Trivandrum registry has 61.2 years as the mean age of presentation similar to this study having 60 years as the mean age.

Ischemic heart disease is the most common cause of acute heart failure in ADHERE, OPTIMIZE along with Trivandrum registry and also this study. RHD is not seen in ADHERE, OPTIMIZE as a cause of heart failure, Trivandrum heart registry showed 8% RHD cases and 13% in this as a cause of acute heart failure. CKD as a risk factor was found in 30% in ADHERE whereas 18% in Trivandrum heart failure registry. Study shows CKD as a cause in 13% of cases.

Duration of hospitalization is 4.3 days as a mean in ADHERE study, 5.3 days in OPTIMIZE study, 8 days in THFR. It was found that mean duration of hospitalization as 8.3 days in this study.

Mortality rates are high in Indian studies with 8.4% in THFR, and 9% in our study. Rates of 3.8% in OPTIMIZE and 4% in ADHERE are observed.

Therefore, it is found that there exists a lot of difference in demographics, presentation pattern, between Indian and western populations of acute heart failure. There is an utmost need to have local and institutional registries to

have an idea about the local population and frame treatment protocols for the same.

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