

DETERMINE THREE MONTHS CLINICAL OUTCOMES AMONG PATIENTS PRESENTING WITH ACUTE DE-COMPENSATED HEART FAILURE

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Contribution

All the authors contributed significantly to the research that resulted in the submitted manuscript.

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ABSTRACT

Objective: To determine three months clinical outcome among patients presenting with acute de-compensated heart failure (ADHF).

Methodology: This cross sectional descriptive study was carried out at Cardiology Department lady Reading Hospital Peshawar, from 4th October 2011 to 3rd July 2012. Patients with acute de-compensated heart failure (ADHF) were included and followed for a period of three months for the outcome in the form of mortality, worsening functional class and re-admission.

Exercise testing was performed on a treadmill according to the modified Bruce protocol, with continuous on-line respiratory gas. The slope of the relationship between ventilation (VE) and CO₂ production (VCO₂) was determined by computerised graphical analysis (VE/VCO₂ slope).

Results: Out of 139 patients, 52.5% were males. Age of patients ranged from 13-90 years with mean age 53.59 ± 18.98 years. Patients were divided into four age groups. Overall 64% patients showed adverse clinical outcome in three months follow up. Adverse clinical outcome was 67% in male patients and 60.6% in female patients. Total re-admission rate was 18.7% higher in less than 30 years of patients with a rate of 35.7%. Worsening functional class was present in 30.21% less common in patients less than 30 years age 21.4%. Mortality rate was present in 15.1% patients as a whole and 33.3% in patients having age 71-90 years at three months follow up.

Conclusion: Patients in acute de-compensated heart failure re admission was much higher in younger age, while worsening of functional class and mortality was more in older age after three months of follow up.

Keywords: Acute de-compensated heart failure, Re admission, Functional class, Mortality.

INTRODUCTION:

Heart failure (HF) is a condition that can result from any structural or functional cardiac disorders leading to inability to pump enough blood to whole body, resulting in the signs and symptoms of HF. 1 ADHF is a rapid onset or change in the signs and symptoms of HF, requiring urgent therapy. The origins of symptoms of HF are not fully understood. Symptoms of congestion may be related to increased left or right ventricular filling pressures. Pulmonary and systemic congestion due to increased left- and right-heart filling pressures is a nearly universal finding in ADHF. Increased pulmonary capillary pressure is responsible for pulmonary edema and shortness of breath in acute HF with evidence of fluid overload.²

Approximately half of hospitalized HF patients have moderate to severely reduced left ventricular (LV) systolic function, with an ejection fraction (LVEF) of less than 40 %. Heart failure with preserved ejection fraction [HFPEF (EF 45-50%)] is another entity present in half the patients with HF. HFPEF is more common in the elderly, women, and those with hypertension or diabetes.³ The prognosis in more recent studies has been shown to be essentially similar to that of systolic HF.⁴

The prevalence of HF is 2-3% and increases with age. At the start of 8th decade, it rises sharply. Prevalence is between 10 and 20% at the age of 70 to 80 year. In younger age groups HF is more common in men because the most common cause, coronary heart disease occurs in earlier decades. In the elderly, prevalence becomes equal between male and female. The mean age of patients with HF in the community in developed countries is 75 years. The outlook is, in general, gloomy although some patients can live for many years.^{5,6}

ADHF is one of the most common syndrome in cardiology associated with decreased life expectancy, prolonged and frequent hospitalizations and high health care costs. ADHF is the cause of 5% emergency hospital admissions, 10% hospital beds occupancy and accounts for about 2% national expenditure on health.³ It is the most common cardiovascular cause of hospitalization in States, with a median stay of 3 to 4 days.⁷ Patients with ADHF are 3.5 times as likely to die, spend six times as many days in the hospital, and incur four times the health care costs compared with patients of the same age and sex.⁸ One third of these patients are re-admitted within 90 days for recurrent de-compensation. Hospitalization for ADHF is a powerful predictor of re-admission and post-discharge death in patients with chronic HF, with mortality rate as high as 20% after discharge.⁹

Outcome of heart failure patients in the acute de-compensated phase have not been adequately described in our setup. The aim of this study is to know three months

outcome among patients presenting with ADHF. This study will provide local data on short term outcome in ADHF patients. It will help in planning strategies to further improve care and outcome in such patients.

METHODOLOGY

This cross sectional descriptive study was carried out at Cardiology Department, from 4th October 2011 to 3rd July 2012. It was 9 months study including 3 months period of follow up. Sample size was 139 using 10% proportion of re-admission among patients with ADHF, with 95% confidence level and 5% margin of error using WHO software for sample size determination.

The study was approved from hospital ethical committee. The purpose and benefits of the study was explained to all patients and written informed consent was taken. Patients of all ages and both genders, presented to Cardiology Unit, with ADHF with New York Heart Association (NYHA) class III or IV were considered eligible for enrolment. ADHF was defined as shortness of breath at rest and any four of the following criteria: raised jugular venous pressure (more than 5 cm from the sternal angle with patient lying 45 degree on bed), peripheral edema (swelling of ankles with appearance of pitting on pressing for 5 seconds with thumb), hepatomegaly (Liver palpable 2cm below the right costal margin), ascites (fluid in the peritoneal cavity, confirmed by shifting dullness), rales (Crackling sounds on the back of the chest heard with stethoscope), S3 gallop (early diastolic heart sound detected with stethoscope). Worsening functional class was defined as change in functional class to more severe form. Class was defined as; Class I: Dyspnea with six or more than six minutes' walk on plain ground. Class II: Dyspnea with more than three and less than six minutes' walk on plain ground. Class III: Dyspnea with three or less than three minutes' walk on plain ground. Class IV: Dyspnea at rest. Re-admission was defined as re-hospitalization for ADHF within three months after discharge. Mortality was defined as death due to any cause within three months after discharge.

Patients admitted via outpatient or emergency department using non probability convenient sampling were included in the study. Strict exclusion criteria was followed to control confounders and bias in the study results. Patients with acute left ventricular heart failure, chronic obstructive pulmonary disease, chronic renal failure and chronic liver disease were excluded from the study. Detailed history was taken from the patients. Complete examination including general physical examination and systemic examination were carried out. Relevant investigations including Electrocardiography (Cardiofax) and Echocardiography (Siemens Acuson CV-70) were done. All patients were kept in ward or CCU and managed as per ACC/AHA guidelines for heart failure. Once stabilized and improved in one NYHA

class, patients were discharged on standard medications and followed at monthly intervals through follow-up visits and via phone calls to detect outcome, up to three months. Outcome was measured in terms of re-admission, worsening in functional status after discharge and death. All the information was recorded on a pre-designed proforma.

The collected data was stored and analyzed using SPSS version 16. Mean \pm SD were calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, re-admission, worsening in functional class and death.

RESULTS

A total of 139 patients with ADHF were included in the study. No patient was lost to follow up. Out of these, 73(52.5%)

were males and 66(47.5%) females. Age of the study population ranged from 13 to 90 years with mean age 53.59 ± 18.98 years. Patients were divided into four age groups: Group A 13-30 years, group B 31-50, group C 51-70 and group D 71-90 years. The number of patients in each group were as follow: Group A = 28 (20.1%), Group B = 35 (25.2%), Group C = 46 (33.1%) and Group D = 30 (21.6%).

Overall 64% patients showed adverse clinical outcome over three months follow up. Composite of adverse clinical outcome was 67.1% in male patients and 60.6% in female patients. Three months re-admission rate was 26(18.70%) in all patients. Group A and B had a re-admission rate of 35.7% and 25.7% respectively while group C and D had a re-admission rate of 10.8% and 6.6% respectively. Worsening functional class was reported in 42 (30.21%) of patients.

Table 1: Baseline Characteristics Of The Patients (n: 139)

Variables	Number (%age)
Gender	
Male	73(52.5)
Female	66(47.5)
Mean Age	53.59 \pm 18.98
Group A(13-30)	28(20.1)
Group B(31-50)	35(25.2)
Group C(51-70)	46(33.1)
Group D(71-90)	30 (21.6)
Coronary Artery Disease	74(52.2)
Rheumatic Heart Disease	37(26.6)
Cardiomyopathy	28(20.1)
Atrial Fibrillation	15(16.8)

Table 2: Three months clinical outcomes in patients with ADHF

Category	Overall n=139 (%age)	Age Group A n(%age)	Age Group B n(%age)	Age Group C n(%age)	Age Group D n(%age)
Worsening Class	42 (30.12)	12(16.4)	12(34.3)	15(32.6)	9(30.3)
Re-admission	26.(18.7)	10(35.7)	9(25.7)	5(10.8)	2(6.6)
Death	21(15.1)	2(7.1)	3(8.6)	6(13.3)	10(33.3)
Composite of adverse clinical outcomes	89(64)	18(64.2)	24(68.6)	26(54.7)	21(69.9)

According to age, rate of worsening in functional class was observed in group A 21.4%, group B 34.3%, group C 32.6% and group D 30%. Three months mortality rate was 21(15.1%) among study population. Rate of death was higher with increasing age. It was 7.1%, 8.8%, 13% and 33.3% in age group A, B, C and D respectively.

DISCUSSION

Our study reported worse short term clinical outcome in patients with ADHF. Adverse clinical outcome was higher in male patients though results were not significant statistically. Our findings are similar to that reported in previous studies. Mauro Feola¹⁰ followed patients with ADHF for fourteen months and showed adverse clinical outcome in 14.3% of patients. Similarly Vaartjes et al¹¹ in their studies had higher frequency of adverse clinical outcome especially in male patients. In SOLVD¹² trial, higher survival rate was observed in men than in women.

Mean age of ADHF in our patients was lower as compared to that reported in international literature. Laura Venskutonyté¹³ in their study reported 67.15 ± 12.5 years mean age. Similarly study done by Spinar et al¹⁴ found mean 71.5 ± 12.4 years. However in a local study¹⁵ mean age of heart failure patients was 48.5 years which was similar to our findings. It is clear that patients with ADHF in our setup present at a younger age as compared to western population

Higher re-admission rate was observed in female gender and younger age group. In a study conducted by Ko et al¹⁶ the frequency of re-admission was 14.1% at 90 days in HF patients. Similarly study by M.S. Nieminen et al¹⁷ showed 20% re-admission rate with similar findings in both genders in ADHF patients at three months follow-up. In contrast Mauro Feola¹⁰ showed 7.6 % re-admission rate in 14

months follow-up of heart failure patients. Reason for higher re-admission rate in young age population was the high prevalence rate of rheumatic heart disease in young female patients.

One third of our patients presented with worsening heart failure. Worsening heart failure was common in patients who were in NYHA class III and II at discharge. In a Study by Ali Ahmed¹⁸ the frequency of worsening functional class in NYHA class I, II, III and IV patients was 14.2%, 17.1%, 32.5% and 33.3% respectively. These results are comparable to our study.

ADHF has higher short term mortality as was observed in 15% of our patient. In our observation death occurred more in higher age group. It is because of increased prevalence of coronary artery disease and NYHA class IV in this age group. As evident by published literature^{10,12,19} coronary artery disease, increased age and NYHA class IV are strong predictors of increased mortality in heart failure patients. Our observation is supported by Velavan P et al²⁰ who in their study had 13% mortality for ADHF within three months of follow-up. But Laura Venskutonyté¹³ 137.5% mortality at three months and V.P. Harjola et al²¹ 8.1% mortality in these patients was much lower compared to our study. Small sample size was a limitation of our study. Long term data is required to determine the long term outcome of ADHF patients.

CONCLUSION

Patients in acute de-compensated heart failure re admission was much higher in younger age, while worsening of functional class and mortality was more in older age after three months of follow up.

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