



ORIGINAL ARTICLE

Frequency of acute heart failure in patients undergoing thrombolysis for anterior wall myocardial infarction.

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ABSTRACT... Objective: To determine frequency of acute heart failure in patient undergoing thrombolysis for anterior wall MI. **Study Design:** Cross-sectional study. **Setting:** Faisalabad Institute of Cardiology, Faisalabad. **Period:** July 2017 to December 2019. **Material & Methods:** After approval from hospital Ethical committee of Faisalabad institute of cardiology. **Results:** 150 patients with acute anterior wall myocardial infarction were recruited from the emergency department of Faisalabad institute of cardiology. They were thrombolysed as per local protocol i.e 1.5 million units of Streptokinase intravenous with proper monitoring. Then patients were evaluated for sign and symptoms of heart failure (as per operational definition) within 3 days of admission. **Results:** In our study, out of 150 cases, 51.33% (n=77) were between 25-50 years of the age whereas 48.67% (n=73) were between 51-70 years of age, mean+sd was calculated as 50.09±9.14 years, 46% (n=69) were male whereas 54% (n=81) were females. Frequency of acute heart failure in patients undergoing thrombolysis for acute anterior wall myocardial infarction was recorded in 16% (n=24). **Conclusion:** We concluded that the frequency of acute heart failure is higher in patients undergoing thrombolysis for acute anterior wall myocardial infarction and needs to draw attention, however, some other trials are required to validate our results.

Key words: Acute Anterior Wall Myocardial Infarction, Acute Heart Failure, Thrombolytic Therapy.

INTRODUCTION

Myocardial infarction as the name implies is the death of muscles of heart called myocardium. This death is irreversible and result of prolonged ischemia due to lack of oxygen supply. It is very common now-a-days in 3rd world countries where statistics are still deficient but in developed world like United States, approximately 1.5 million patients develop myocardial infarction annually.^{1,2}

ST-segment elevation myocardial infarction (STEMI), the most common form of myocardial infarction followed by Non-ST segment myocardial infarction (NSTEMI). Process of infarction starts from endocardium as it has least blood supply and maximum oxygen demand. This process progresses and involves full thickness of the myocardium.³

Anterior wall of heart has maximum contribution

in contractility and ejection fraction. Its infarction lead to worse prognosis than others walls of heart generally because of left ventricular dysfunction resulting from infarction. There is larger increase in cardiac biomarkers indicating larger infarct size thus there is greater reduction in left ventricular ejection fraction.⁴ This reduction in EF leads to symptomatic heart failure acutely which is main cause of hospitalizations in older patients in the western world⁵ and a leading cause of mortality.⁶ Prognosis of heart failure remains poor with 5-year mortality as high as around 50% even after recent advancement in heart failure therapy in last decade.^{6,7}

One study showed that the frequency of acute heart failure was 12.8% in patients of anterior myocardial infarction.⁸ Another study showed higher frequency (31.3%) of acute heart failure in Ant. MI.⁹ Data of acute heart failure in literature

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is less supportive of higher frequency but results are controversial in literature as we see much higher numbers in routine. It need some careful management and preventive methods to prevent acute heart failure related morbidity and mortality. Also, no local evidence has been found in literature which can help us in determining the extent of problem in local population.

Rationale of this study is to find out the true picture of the problem which will help us in planning the preventive and management strategies for prevention of acute heart failure in anterior wall myocardial infarction patients.

MATERIAL & METHODS

This study was conducted at Faisalabad institute of cardiology, from July 2017 to December 2019. After approval from hospital Ethical committee of Faisalabad institute of cardiology, 150 patients were recruited from the emergency department of Faisalabad institute of cardiology. Patients of age 25-70 years of either gender presenting with AAMI were included in study and were thrombolysed. Patients with advanced liver disease (cirrhosis of liver on USG), kidney disease (creatinine >3mg/dl or on hemodialysis), anemia (Hb <10g/dl), undergoing primary PCI, with previous MI, CABG, PCI (medical record), late for thrombolysis or have contraindications for thrombolysis and with valvular heart diseases (on medical record) were excluded. They were thrombolysed as per local protocol i.e 1.5 million units of Streptokinase intravenous with proper monitoring. Then patients were evaluated for sign and symptoms of heart failure (as per operational definition) within 3 days of admission. All this information along with demographic information including name, age, gender, diabetes and hypertension was noted on specially designed proforma. Data was analyzed through in SPSS version 20. Quantitative variable like age was presented as mean and standard deviation. Qualitative variables like gender, diabetes, hypertension and acute heart failure was presented as frequency and percentage. Data was stratified for gender, age, diabetes and hypertension. Post stratification chi-square test was applied. P-value ≤ 0.05 was taken significant.

RESULTS

In this study, total 150 cases were enrolled based on inclusion and exclusion criteria. Mean and standard deviation was calculated for age (50.09±9.14 years), they were broadly divided in two groups with 1st group between 25-50 years included 51.33% (n=77) patients and between 51-70 years of age, 48.67% (n=73) patients were included. 46% (n=69) patients were male whereas 54% (n=81) were females. Frequency of diabetes mellitus was recorded in 50% (n=75) of the cases whereas 32.67% (n=49) had hypertension. Frequency of acute heart failure in patients undergoing thrombolysis for anterior wall myocardial infarction was recorded in 16% (n=24) whereas 84% (n=126) had no findings of the heart failure. In group 1 of age 25-50 years, 15.6% (n=12) had heart failure and in group II between 51-70 years of age, 16.4% (n=12) had heart failure, with p value of 0.88. Proportion of heart failure was almost similar between two gender with 15.9% (n=11) in male and 16.05% (n=13) in female gender with p value 1.25. It was found in our study that non- diabetics had more heart failure cases 20.3% (n=13) than diabetics 12.8% (n=11) with p value 0.21. Out of total hypertensive patients, 18.4% (n=9) developed heart failure. Those who were non hypertensive also developed heart failure with frequency of 17.4% (n=15) with p value 0.58.

Age	No. of Patients (%)
25-50	77 (51.33%)
51-70	73 (48.67%)
Gender	
Male	69 (46%)
Female	81 (54%)
Heart Failure	
Yes	24 (16%)
No	126 (84%)

Table-I. Distribution of age, gender and presence of Heart failure in AAMI

DISCUSSION

Acute anterior wall myocardial infarction (MI) is generally regarded as having higher risk compared with inferior wall MI. The reported in-hospital mortality rate ranges from 22% in the pre-thrombolytic era to 7%-8% in the thrombolytic era, which is about 50% more than anterior wall MI.

Characteristic	No. of Patients	Heart Failure		P-Value
		Yes	No	
Age				
25-50	77	12 (15.6%)	65 (84.4%)	0.88
51-70	73	12 (16.44%)	61 (83.56%)	
Gender				
Male	69	11 (15.94%)	58 (84.06%)	1.25
Female	81	13 (16.05%)	68 (83.95%)	
Diabetes Mellitus				
Yes	75 (50%)	11 (12.8%)	75 (87.2%)	0.21
No	75 (50%)	13 (20.3%)	51 (79.7%)	
Hypertension				
Yes	49 (32.67%)	9 (18.4%)	40 (81.6%)	0.58
No	101 (67.33%)	15 (17.4%)	86 (82.4%)	

Table-II. Stratification for frequency of acute heart failure in anterior wall MI

Literature show that the chances of acute heart failure in patients of anterior wall myocardial infarction are not so high. But results are controversial in literature as we see much higher numbers in routine. It needs careful management and preventive methods to prevent acute heart failure related morbidity and mortality. Also, no local evidence has been found in literature which can help us in determining the extent of problem in local population.

We planned this study to find out the true picture of the problem which will help us in planning the preventive and management strategies for prevention of acute heart failure in anterior wall myocardial infarction patients.

In our study, out of 150 cases, 1st group of 25-50 years included 51.33% (n=77) patients whereas 48.67% (n=73) were between 51-70 years. Mean and SD was 50.09±9.14 years. It included 46% (n=69) male whereas 54% (n=81) were females. Frequency of acute heart failure in patients undergoing thrombolysis for acute anterior wall myocardial infarction was recorded in 16% (n=24).

The findings of our study were similar with a study showing frequency of acute heart failure as 12.8% in patients of anterior myocardial infarction. Another study showed higher frequency of acute heart failure i.e. 31.3% in patients of acute myocardial infarction. These findings are higher than our study.

HF in patients of MI was first described by Killip in the 1960s as an adverse prognostic parameter.¹⁰ In patients with large infarctions and multivessel disease, the chances of heart failure are higher and mortality is higher in patients of LV systolic dysfunction.^{11,12} Before thrombolytic era, the incidence of HF during admission after ST-elevation myocardial infarction (STEMI) was approximately 40%.¹³ After thrombolysis, this incidence reduced significantly with HF in approximately 3% of patients at presentation and later on 17% develop during admission.¹⁴ Reperfusion with thrombolytics was associated with preservation of LV systolic function and thus long-term survival is improved.¹⁵ HF developing during admission has adverse prognosis, with approximately 5 fold higher 1-year mortality rates.¹⁶

With invention of primary PCI, the rates of heart failure are further reduced. In an Italian study conducted between 1995 and 2005, out of 2089 MI patients who were treated with Primary PCI, 17% had HF at presentation, but only 1% developed new onset HF during the hospital admission.¹⁷ Similarly, in HORIZONS-AMI cohort analysis of 3602 patients treated with Primary PCI, 8.0% of patients were in Killip class II to Killip class IV at presentation. On follow-up of 30 days, only 4.6% of patients had developed Heart failure as a disease entity rising to 5.1% at 2 years.¹⁸

These studies are not comparable directly. They reflect selected trial with a short duration of follow-

up and heart failure diagnosis is also based on different parameters. Between 1979 and 1994, 1537 patients with an index MI were identified in Olmsted County in thrombolytic era in the late 1980s.¹⁹ In 5-year study period, the incidence of HF decreased from 40% to 33%. In another study of 2596 MI patients, there was increasing use of primary PCI. There was decreased risk of both early (0-7 d; HR = 0.67, 95%CI: 0.54-0.85) and late (8 d-5 years; HR = 0.63, 95%CI: 0.45-0.88) HF.²⁰ It was also found that mortality was higher in early onset heart failure than late onset HF.²¹

A reduction in HF after MI has also been seen in other studies. In 2.8 million hospitalizations in MI patients between 1998-2010, there was a reduction in the incidence of HF hospitalization from 16 to 14 per 100 person-years.²² In a Danish study, the incidence of HF reduced from 24% to 20% as there was an increase in PCI from 2.5% to 38% between 1997 and 2010. In Western Australia at 90 days, between 1996 and 2007, there was a reduction in the prevalence of HF from 28% to 17%. In In SWEDHEART registry of 1998 patients between 1996 and 2008 who were admitted with MI, there was significant reduction in the incidence of clinical HF from 46% to 28% due to increasing use of primary PCI. In absence of local evidence, our findings are primary and needs to be verified through some other trials.

CONCLUSION

We concluded that the frequency of acute heart failure is higher in patients undergoing thrombolysis for acute anterior wall myocardial infarction and needs to draw attention, however, some other trials are required to validate our results.


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