

Original Research Article

Assessment of risk factors in cardiac failure after myocardial infarction

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ABSTRACT

Background: Cardiac failure is a clinical syndrome that may result from any structural or functional cardiac disorders that impairs the pumping ability of the heart. Post infarction cardiac failure is one of the common complications of Acute Myocardial Infarction which is influenced by factors like extent of MI, Life style, associated co-morbid conditions.

Methods: The present study comprises of 50 cardiac failure patients with history of MI in the past and who presented with myocardial infarction with cardiac failure were included in this study. This study was conducted at Rajiv Gandhi Institute of Medical Sciences, Kadapa, YSR District, Andhra Pradesh. The study was carried out for a period of 2 years. Informed consent was taken from each and every patient included in the study.

Results: In our study 42 (84%) are males and 8 (16%) are females. Out of 50 patients 37 (74%) are smokers and 32 (64%) are alcoholics. In our study maximum number of patients i.e. 60% of the patients are sedentary in nature. Among 42 male patients 28 are having WHR >0.9 and 8 female patients WHR >0.8 is quite significant.

Conclusions: Post MI cardiac failure is more common in males and sedentary lifestyles. Smoking, alcohol consumption and associated co morbid conditions have linear relationship with incidence of post infarction Cardiac failure. Abdominal obesity has positive effect on incidence of post MI cardiac failure.

Keywords: Cardiac failure, Co morbid conditions, Post myocardial infarction, Sedentary lifestyle

INTRODUCTION

Cardiac failure is a clinical syndrome that may result from any structural or functional cardiac disorder that impairs the pumping ability of the heart.^{1,2}

If the compensatory mechanisms are not able to cope up the cardiac function, the increased Left Ventricular End Diastolic Volume (LVEDV) will lead to increased myocardial wall tension and increased myocardial oxygen demand, which further increases left ventricular end diastolic pressure and leads to pulmonary congestion and ultimately leads to right heart failure. Scarring of the inferior wall of the left ventricle often involves the

posteromedial papillary muscle, which gives rise to mitral regurgitation.³

If mechanical complications are associated in acute myocardial infarction such as papillary muscle dysfunction, mitral regurgitation, ventricular septal rupture etc., will further increase the myocardial wall tension and oxygen demand which finally leads to pulmonary congestion.

At the same time these complications also depends on some other risk factors like male gender, older age, physical inactivity, overweight, diabetes mellitus, hypertension, associated valvular heart diseases, cigarette smoking and coronary heart diseases etc.⁴

The risk of sudden death is highest in the first 30 days after MI among patients with LV dysfunction, heart failure or both. Thus, earlier implementation of strategies for preventing sudden death may be warranted in selected cases.⁵

METHODS

The present study comprises of 50 cardiac failure patients with history of MI in the past and who presented with myocardial infarction with cardiac failure were included in this study. This study was conducted at Rajivgandhi Institute of Medical Sciences, Kadapa, YSR district, Andhra Pradesh. 50 cases of post myocardial infarction in Cardiac failure were selected who attended medical and cardiology OPD and admitted in medicine and cardiology wards between November 2015-October 2017.

Detailed medical history, general, physical and systemic examinations were noted. Along with above criteria Life style, Waist Hip Ration (WHR), BMI and number of episodes also noted.

Evaluation and Investigations required: blood investigation-biochemical and other routine, urine routine, lipid profile, ECG, chest X-ray, 2D ECHO, TMT if required. The study was carried out for a period of 2 years and informed consent was taken from each and every patient included in the study.

RESULTS

Distribution according to age and sex in the study group is 2% males fall in the age group 21-30, 8% in the age 31-40, 22% in 41-50 age group, 24% in 51-60 and 28% of males fall in 61-70 age group whereas 4% of females were in the age group of 41-50, 6% in 51-60 and 6% of females fall in the age group of 61-70 (Table 1).

Table 1: Distribution according to age and sex in the study group.

Age	Female	%	Male	%
21-30	0	0	1	2
31-40	0	0	4	8
41-50	2	4	11	22
51-60	3	6	12	24
61-70	3	6	14	28
Total	8		42	

Physical activity is one of the most important modifiable risk factor. Sedentary lifestyle has more incidences than non sedentary or mixed pattern of physical activity in almost all age groups. In our study maximum number of patients i.e. 60% of the patients are sedentary in nature and Mixed lifestyle patients are 11(22%) (Table 2).

In our study, there are 32 patients (64%) consume Alcohol and only 18 patients (36%) are non alcoholics.

Consumption of alcohol (>90gm/dl) in a cardiac patient may predispose to clinical picture resembling idiopathic DCM. Patients with advanced alcoholic cardiomyopathy may develop transient and chronic form of LV dysfunction and later progressed to CHF who have poor prognosis, which is correlated to this study (Table 3).

Table 2: Distribution according to nature of physical activity and incidence of post MI failure.

Age	NS	%	Mx	%	S	%
21-30	0	0	0	0	1	2
31-40	1	2	1	2	2	4
41-50	1	2	3	6	9	18
51-60	3	6	4	8	8	16
61-70	4	8	3	6	10	20
Total	9		11		30	

Physical Activity-S-Sedentary, Mx-Mixed, NS-Non Sedentary

Smoking is one of the risk factors for many diseases apart from MI and cardiac failure; smoking appears to be a major risk factor for angina without significant coronary narrowing. Smoking is atherogenic which leads to many cardiac complications. Here the study showed nearly 74% are smokers which is significant compared to non smokers (26%) (Table 3).

Table 3: Influence of personal habits on post MI cardiac failure.

	Alcohol		Smoking	
	Number	%	Number	%
Yes	32	64	37	74
No	18	36	13	26
Total	50	100	50	100

Results of European fat distribution study and Paris prospective study demonstrated importance of abdominal fat and greater WHR in cardiovascular and coronary heart disease mortality.

There is a continuous positive relationship of all markers of obesity (BMI, waist size, WHR) with major coronary risk factors-HTN, DM, and metabolic syndromes, while WHR also correlates with lipid abnormalities.

In our study, a significant number of patients (38) have BMI >25kg/m² i.e. overweight. At the same time patients with normal BMI and underweight are also at risk. This may be due to other co morbid conditions like DM, HTN, metabolic syndrome, CKD etc. Smoker may have less BMI when compared to their non-smoker counterpart (Table 4).

WHR >0.9 in men and 0.8 in women is associated with a significant increase in multiple risk factors. Among 42 male patients 28 are having WHR >0.9. Out of 8 female patients WHR >0.8 of all 8 which is quite significant (Table 5).

Table 4: Effect of BMI in post MI cardiac failure in the study group.

Age	U	N	Ow	Ob	Ex	Total
21-30	0(0%)	0(0%)	0(0%)	1(2%)	0(0%)	1
31-40	0(0%)	0(0%)	3(6%)	1(2%)	0(0%)	4
41-50	0(0%)	1(2%)	11(22%)	1(2%)	0(0%)	4
51-60	0(0%)	5(10%)	4(8%)	5(10%)	1(2%)	15
61-70	2(4%)	4(8%)	2(4%)	7(14%)	2(4%)	17
Total	2	10	20	15	3	50

Body Mass Index (BMI), U-Underweight <18.5kg/m², N-Normal 18.5-24.9Kg/m², Ow-Over Weight 25-29.9 kg/m², Ob-Obesity 30-39.9 kg/m², Ex-Extreme Obese >40Kg/m²

Table 5: Effect of WHR in post MI cardiac failure in the study group.

WHR	Number	%
In males		
< 0.9	14	33.33
>0.9	28	66.67
In Females		
< 0.8	0	0
>0.8	8	100

In substantial number of cases failure is due to either with history of one episode or repeated attacks. Patients with repeated attacks are having high incidence of mortality. In our study maximum number 41 (82%) are with history of one attack. 7 (14%) patients are with two episodes. Only 2 (4%) patients presented with history of three episodes. Unfortunately, two patients expired (Table 6).

Table 6: Distribution according to history of MI-number of episodes in the study group.

Age	One episode	%	Two episode	%	Three episode	%
21-30	1	2	0	0	0	0
31-40	4	8	0	0	0	0
41-50	10	20	2	4	1	2
51-60	13	26	2	4	0	0
61-70	13	26	3	6	1	2
Total	41		7		2	

DISCUSSION

According to European Society of Cardiology, the diagnosis of heart failure based on essential and non-essential feature.⁶

The following investigations should be carried out in a patient with suspected heart failure. Twelve lead electrocardiography, chest radiography, cardiac imaging, blood biochemistry, urine analysis, others.¹

X-ray chest routine P/A view left ventricle, atrium pulmonary arteries, LV aneurysm, right atrium

enlargements, calcified valves can be visualized lateral view especially useful in the diagnosis of right ventricular enlargement by obliteration of retrosternal space. Right anterior oblique view-to visualize the left atrium and its enlargement in post infarction failure. Left anterior oblique: it is superior to other projection for detecting right ventricular enlargement, enlargement of right atrium etc.⁷

Post myocardial infarction cardiac failure is common after rupture of the heart. This occurs after 1-7 days of MI. Among the three causes of rupture, electromechanical dissociation, sub-acute cardiac rupture false, false and true aneurysms. The catastrophic rupture due to electromechanical dissociation is common.⁸

The prognosis and outcome of the heart failure depend on so many factors like age, onset of heart failure, other comorbid conditions etc. Killip classification is a powerful independent predictor of all-cause mortality in patients with non- ST- elevation acute coronary syndromes. Age, Killip classification, heart rate, systolic blood pressure, and ST depression should receive particular attention in the initial assessment of these patients.⁹

Heart Failure post-MI occurs in a time dependent fashion, which is usually not a direct consequence of a detectable interim MI. Patients who experience late onset HF have a ten- fold increased risk of death compared with other MI survivors.¹⁰

CONCLUSION

Post MI cardiac failure is more common in males and sedentary lifestyles. Smoking, alcohol consumption and associated co morbid conditions have linear relationship with incidence of post infarction cardiac failure. Distribution of fat in the body mainly abdominal obesity has positive effect on incidence of post MI cardiac failure. MI involving anterior wall, either isolated or associated with other wall was most commonly associated with cardiac failure. Most of the patients have associated co morbid conditions. There is a continuous positive relationship of all markers of obesity (BMI, Waist size, WHR) with major coronary risk factors like HTN, DM, and Metabolic Syndromes, while WHR also

correlates with lipid abnormalities. WHR >0.9 in men and 0.8 in women is associated with a significant increase in multiple risk factors. Among 42 male patients 28 are having WHR >0.9 out of 8 female patients; WHR of all 8 is >0.8 which is quite significant. In our study maximum number of patients i.e. 60% of the patients are sedentary in nature.

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Ethical approval: Not required

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