CORONARY ARTERY DISEASE:
SEVERITY & ITS ASSOCIATED RISK FACTORS IN CAUSING HEART FAILURE
IN PATIENTS PRESENTED WITH STEMI AT GULAB DEVI CHEST HOSPITAL

Usman Javed Iqbal¹, Majid Kaleem², Muhammad Imran Hanif³

ABSTRACT...
Background: Development of heart failure is always secondary to presence of risk factors like diabetes mellitus, hypertension, age, smoking and underlying coronary artery disease. Objective: The objective of this study was to find the frequency of risk factors and coronary artery involvement in patients of heart failure after myocardial infarction. Study Design: A non-randomized cross sectional study. Setting: Gulab Devi Chest Hospital. Period: Six months. Methods: 100 patients was done. Using non probability (purposive) sampling technique; all patients with ages between 20 to 80 years, irrespective of gender, diagnosed with heart failure (with ejection fraction ≤ 40%) secondary to STEMI were included in the study. Patients that were not having heart failure secondary to STEMI and those that hadn’t their coronary angiography done were excluded from the study. The data were analyzed using SPSS Version 20. Descriptive statistics was used to see analyze the data. Results: Mean age of patients was 52.61±10.2years. There was an overall male predominance (81%). Common risk factors that we observed were smoking (65%), hypertension (62%), diabetes (58%) and positive family history (38%). In this study 51% patients had triple vessels disease, 15% patients had double vessels disease and 34% patients had single vessel disease. Most common lesion was of LAD following LCX, RCA and LMS. Conclusion: Our study conclude that coronary artery disease is the main causative factor for the development of heart failure in patients of myocardial infarction and even a single vessel disease can lead to heart failure with severe systolic dysfunction. Most common associated risk factor was smoking, hypertension being the second most common following diabetes and positive family history.

Key words: Ischemic heart diseases (IHD), Myocardial Infarction (MI), Heart Failure, Risk factors.

INTRODUCTION
Congestive heart failure is a common sequels of myocardial infarction in patients with atherosclerotic heart disease¹ and it is the only category of cardiovascular disease for which the prevalence, incidence, hospitalization rate, total burden of mortality and cost have increased in the past 25 years.² Fueling this epidemic is the increasing number of elderly patients developing impaired left ventricular (LV) function as a manifestation of chronic coronary artery disease (CAD). At least half the patients with heart failure have a low ejection fraction (40% or less).³ Coronary artery disease is the cause of approximately two thirds of cases systolic heart failure.⁴ There are a number of risk factors like age, gender, family history, smoking habit, diabetes and hypertension which are associated with development of CAD.⁵ Moreover CAD, hypertension, and diabetes singly or in combination, predominate as causes of heart failure.⁶ Our study evaluate that which type of coronary artery lesion has increased incidence of development of heart failure and which vessel more commonly is vulnerable to disease with respect to presence of certain risk factors.

MATERIALS & METHODS
Design & Setting
Our study was a cross sectional survey of 100 patients presented in CCU of Gulab Devi chest hospital. Study was completed in six months.

Sample selection
Using non probability (purposive) sampling technique; all patients with ages between 20 to 80 years, irrespective of gender, diagnosed with heart
failure (with ejection fraction \( \leq 40\% \)) secondary to STEMI were included in the study. Patients that were not having heart failure secondary to STEMI and those that hadn’t their coronary angiography done were excluded from the study.

**Data collection**

A short structured questionnaire was prepared and patients were interviewed in ward after taking verbal consent. In addition to collecting basic demographic details, patients were asked about the presence of chronic hypertension and diabetes mellitus. Information was also obtained regarding smoking history and history of ischemic heart disease in first degree relatives. Angiographic findings were also noted down to see the extent of disease.

**Statistical Analysis**

Data were entered and analyzed using SPSS software version 20. Qualitative data were presented in form of \( f(\%) \) while quantitative data were presented in form of mean±S.D.

**RESULTS**

The mean age of our patient was 52.6±10.2. There was an overall male predominance (81%). Over all the most common risk factor was smoking (65%). Hypertension was the second most common risk factor in our patients; about 62% of them were hypertensive. 60% of the subjects were observed as diabetes and females were more prone to be diabetic than males. A positive family history of IHD was observed on 38 subjects. These sociodemographic and risk profile is illustrated in Table-I below.

Table-I shows the descriptive of severity of CAD in terms of coronary artery involvement and diagnosis. 37 patients were diagnosed of anterior wall (A/W) MI, 21 were of Inferior wall (I/W) MI, 20 patients were diagnosed of antero-septal (A/S) MI and 15 patients were presented with Antero-lateral (A/L) MI. With respect to angiographic findings most common vessel involved was left anterior descending (LAD) artery i.e 33% following circumflex artery in 25% patients, right coronary artery (RCA) in 24% and left main stem in 18% of the patients. 51 patients were having triple vessels disease, 34 had single vessel disease while only 15 patients were having double vessel disease.

**DISSCUSSION**

Coronary artery disease remains a leading cause of death and exerts a heavy social and economical toll. According to the results of Faisal et al\(^7\) there is a linear relation between age and CAD risk. These results are similar to our study as 80% of the patients are more than 40 years of age. Gender related differences in cardiac function and myocardial adaptation to injury or stress have been reported previously by Adams et al\(^8\) who suggested that men were more likely than women to have an ischemic etiology of their
heart failure. These findings are similar to our results which also show males predominance about 81%. Various patterns of risk factors of CAD are reported by previous studies. Some studies reported that diabetes predisposes to cardiac failure at all ages in both sexes. Other studies reported hypertensive cardiovascular disease as a common and powerful predisposing cardiovascular condition. About 75% of cardiac failure is associated with hypertension with or without other associated cardiac conditions. Our findings revealed similar results with that of these studies, 62% of our patients were hypertensive, 58% were diabetics 65% were smokers and 38% patients had a positive family history of coronary heart disease. Gheorghiade et al showed a strong association of heart failure with coronary artery disease and described CAD as the most common underlying disease in HF patients. Another study suggested CAD as the underlying cause of HF in approximately 2/3 of the patients with left ventricular systolic dysfunction. The remainders have non ischemic causes of systolic dysfunction and may have an identifiable cause viz hypertension, valvular disease, myocarditis etc. Our study showed consistency with previous studies described, as in our research there were 100 patients of heart failure with known underlying cause, coronary artery disease; 34% patients had developed heart failure by single coronary vessel involvement, 15% patients had develop heart failure due to double vessel involvement and 51% had develop heart failure due to triple vessel involvement. There were 23.49% involvement of right main coronary artery, 33.33% involvement of left main coronary artery, 18.31% involvement of left anterior descending artery and 24.87% involvement of left circumflex artery.

Ultimately on the basis of literature we can say that coronary disease and other risk factors such as hypertension, and diabetes singly or in combination, predominate as causes of heart failure.

CONCLUSION
According to this study it is concluded that coronary artery disease is the main causative factor for the development of heart failure in patients of myocardial infarction and even a single vessel disease can lead to heart failure with severe systolic dysfunction. Moreover this study shows that the most common lesion was of LAD with the left circumflex becoming the 2nd most common then right main coronary artery and then left main stem becoming the least common artery involved in coronary artery disease.


“Age is not a limit for working hard.”

Shuja Tahir

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Author-s Full Name</th>
<th>Contribution to the paper</th>
<th>Author=s Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Usman Javed Iqbal</td>
<td>Writing of research report, data analysis</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Majid Kaleem</td>
<td>Concept &amp; idea</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>M. Imran Hanif</td>
<td>Critical/Proof reading, suggestions</td>
<td></td>
</tr>
</tbody>
</table>