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ACUTE INFERIOR WALL MYOCARDIAL INFARCTION;

FREQUENCY OF COMPLETE HEART BLOCK AND ITS RELATION WITH SEVERE OBSTRUCTIVE DISEASE OF THE INFARCT RELATED ARTERY.

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ABSTRACT… Objectives: To find the frequency of complete heart block in acute inferior wall myocardial infarction and its relation with severe obstructive disease of the infarct related artery. **Study Design:** Cross sectional study. **Setting:** Department of Cardiology Choudhary Pervaiz Elahi Institute of Cardiology, Multan. **Period:** June 2016 to June 2017. **Methodology:** None probably consecutive sampling technique was used. Collected data was entered and analyzed through statistical/computer software SPSS vrs 22, mean ± SD was calculated for quantitative data and variables like, age and frequency (percentage) was calculated for qualitative data like gender, dominant artery and CHB. P value ≤ 0.05 was considered as significant. **Results:** A total number of n=234 (100%) patients were included in this study, both male and female genders. Distribution of Gender showed that male patients were more than females patients i.e. n=198 (84.6%) and n=36 (15.4%) respectively. The main outcome variable of this study was severity of disease. It was observed that, in with CHB group, severity of disease noted as 93.2% (n=109) patients while in without CHB group it was 57.3% (n=67). **Conclusion:** Inferior wall MI has severe adverse effects when combines with complete AV nodal heart block. Severity of disease was significantly associated with gender. Almost all times infarct related artery was dominant right coronary artery.

Key words: Complete Heart Block, Myocardial Infarction, Severe Obstructive Disease, Coronary Artery.

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INTRODUCTION

Prevalence rate of third degree heart block or complete heart block is 0.04% in the world.[1] About 15% of 3rd degree trioventricla (AV) blocks interrupt the inferior wall. After acute MI there were 15-20% chances of conduction disorders, and prognosis after this event is slower or may be adverse like cardiogenic shock, left ventricular fibrillation (LVF) and cardiac arrest.[2] Normally anterior wall myocardial infarction (MI) has bad outcomes as compare to inferior wall MI but when inferior wall MI combines with complete heart block it has very poor outcomes.[3,4]

After incident of complete heart block (CHB), if reperfusion is attained in early time period than mortality reduced to 10-15% and 6-10% in pre thrombolytic and thrombolytic era respectively.[5,6] In patients who receive thrombolytic treatment only 5% develop late CHB. Conservative management to attain reperfusion is not effective when thrombus cannot be removed or resistant to thrombolytic therapy. Timely revascularization of these patients is treatment of choice because through revascularization reperfusion with good outcomes can be gained.[7]

Blood supply of AV node is RCA, LCx and left anterior descending artery (LADA). Therefore damage from MI of inferior wall varies according to the segment involve.[8] Here is a previous study in which cases of inferior wall MI with CHB have incident of severe CAD was 96.7% and those without CHB have 75.4%. Infarction occurs in 95% of patients with RCA dominancy, left Cx dominancy was found in 1% and 56% patients found with multiple vessel disease.[9] Percutaneous intervention (PCI) is a useful technique for

treatment of such patients. Early reperfusion of such patients can be achieved with PCI by resolution of CHB.[10]

Very few studies have been conducted and minimum literature is available before on this topic, we plan this study to investigate the frequency of complete heart block in acute inferior wall myocardial infarction and its relation with severe obstructive disease. So that this literature gap can be filled and study will be used as authentic reference for further research.

METHODOLOGY

After approval from hospital ethical committee this cross sectional study was conducted in the department cardiology Chaudhary Pervaiz Elahi Institute of Cardiology, Multan. Study was completed in duration of June 2016 to June 2017. Patients included in this study were informed in detail and consent was taken. Non probability consecutive sampling technique was used. Sample size was calculated with WHO sample size calculator using following figures; CI 95%, Power of test 80% and frequency of CHB 11% in inferior wall MI patients from previous study.

Patients with CHB due to drug use, congenital CHB, history of MI, PCI and who were refused to participate in the study or left the follow up were excluded from the study. All included patients were divided into two groups, those with CHB included in group A and who did not develop CHB included in group B. standard twelve lead ECG was used to record ECG at any six hours for two days and then once daily till the time of discharge. After discharge patient were followed on every seven days by performing coronary angiography. Coronary artery lesion assessed for its severity through stenosis percentage. At the end disease of infarct related artery was assessed by diameter of artery (≥70% diameter). Risk factors of coronary artery disease were also recorded. Complete absence of conduction through atrioventricular node considered as complete heart block, it can be diagnosed on electrocardiogram.[11]

Collected data was entered and analyzed through statistical/computer software SPSS vrs 22, mean and standard deviation was calculated for quantitative data and variables like, age and frequency (percentage) was calculated for qualitative data like gender, dominant artery and CHB. P value ≤ 0.05 was considered as significant. P value was calculated for significance of study and ≤ 0.05 was considered as significant.

RESULTS

A total number of n=234 (100%) patients were included in this study, both male and female genders. Distribution of Gender showed that male patients were more than females patients i.e. n=198 (84.6%) and n=36 (15.4%) respectively. The mean age of the patients was 57.54±6.86 years. The distribution of dominant artery showed that 71.8% (n=168) RCA and 28.2% (n=66) LCCA (Table-I).

Characteristics	Frequency	Percentage (%)
Gender		
Male	198	84.6
Female	36	15.4
Total	234	100.0
Stratified Age		
35-50 years	23	9.8
51-74 years	211	90.2
Total	234	100.0
Dominant arty		
RCA	168	71.8
LCCA	66	28.2
Total	234	100.0
Descriptive Statistics		
	Mean±S.D	
Age	57.54±6.86 years	

Table-I. Demographic variables: (n=234)

When patients were stratified into different age groups, it was noted that majority of patients i.e. 90.2% (n=211) were aged from 51 to 74 years and only 9.8% (n=23) were aged from 35 to 50 years (Table-I).

These 100% (n=234) patients were divided into 2 groups equally, 117 in each, i.e. With CHB and without CHB. The mean age of the patients of with CHB group was 54.82±7.45 years while the mean age of the patients of without CHB group

was 60.26±4.91 years. Gender distribution showed that, in with CHB group, there were more males than females i.e. 88.9% (n=104) and 11.1% (n=13) respectively. Similarly, in without CHB group, there were also more males than females i.e. 80.3% (n=94) and 19.7% (n=23) respectively (Table-II).

Gender			
Groups	**Presence**	**Frequency**	**Percent**
With CHB	Male	104	88.9
	Female	13	11.1
	Total	117	100.0
Without CHB	Male	94	80.3
	Female	23	19.7
	Total	117	100.0
Descriptive Statistics			
	Variable	**Mean±S.D**	
With CHB	Age	54.82±7.45 years	
Without CHB	Age	60.26±4.91 years	

Table-II. Demographic variables in groups

The main outcome variable of this study was severity of disease. It was observed that, in with CHB group, severity of disease noted as 93.2% (n=109) patients while in without CHB group it was 57.3% (n=67) (Figure-1).

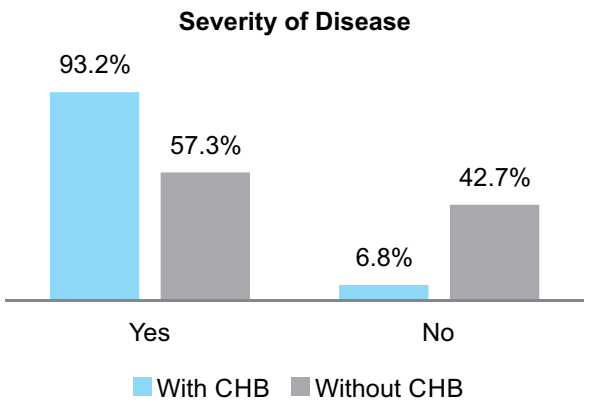

Figure-1. Severity of disease in groups

When Chi-Square was applied to check the association, it was noted that severity of disease was significantly associated with gender and groups with p-values 0.000and 0.000 respectively. But severity of disease was not significantly associated with stratified age with p-value 0.060 (Table-III).

Effect Modifiers		Severity of Disease		Total	P-value
		Yes	No		
Gender	Male	158	40	198	0.000
	Female	18	18	36	
Total		176	58	234	
Stratified Age	35-50 Years	21	2	23	0.060
	51-74 Years	155	56	211	
Total		176	58	234	
Groups	With CHB	109	8	117	0.000
	Without CHB	67	50	117	
Total		176	58	234	

Table-III. Association of severity of disease with effect modifiers (n = 234)

DISCUSSION

To understand the mechanism of heart block after myocardial infarction it is necessary to understand the normal conduction system of the heart. Round about in 90% of cases right coronary artery supplied the conduction to AV node and bundle of His. Other regions like bundle branches and ventricular septum supplied by the LAD artery.[12,13]

Arooj Zahid et al[5] conducted a single center study to find the frequency of CHB in inferior wall MI patients and found 18.6% and severe obstructive disease was associated. Right coronary artery was the main infarct related artery in these patients. No prominent pattern was found in involvement of RCA but patients with CHB have more severe and disease on proximal side. Findings of our study were similar to these results.

In another study Jim MH et al[9,14] found that dominant artery in CHB in inferior wall MI patients was right coronary artery. Frequency of CHB in both groups was as 96.7 % and 75.4% with P value of 0.009 shows significance of these results. Occlusion was proximal in most of patients (63.3% and 40.4%), p value was again significant 0.018. these results again identical to previous study and comparable with our results. Many studies

revealed that CHB mostly associated with age, patients of old age and inferior wall MI are more prone to CHB but in our study we didn't found such age related results.

In another study Bassan et al[15] reported that patients with LAD and develop atrioventricular block have greater prevalence rate than those patients who are without atrioventricular block when acute myocardial infarction occurs. Results of his study were as follows; 95% prevalence among CHB patients and 55% among non CHB patients significance of these results was > 0.05. He also reported that patients with LAD and acute MI are six times more prone to have CHB than non LAD patients. These finding were not reported by many studies even in our study.

Here is another reference of study conducted by Jim et al[14] on 550 patients. in his study 88.6% of patients develop CHB within 24 hours and out of them 54.8 % resolved this CHB within next 24 hours, and 14.3% of patients resolved in more than three days 4.7% patients resolved in seven days and very few patients go for more than 12 days.

In a study Pirzada MA[16] concluded that patient of acute inferior wall MI are more at risk of CHB if they take too much time start medicine. In his study23.6% of patients develop high degree CHB of atrioventricular. Right ventricular infarction was found in 23.7% of patients. In his study he also reported that if CHB combines with RA infarction than mortality may increase to a significant level.

In 2016 Ratan R et al[17] conducted a study on conduction blocks in acute myocardial infarction patients. In his study 100 MI patients were included and 17 (17%) of patients develop conduction. Among conduction block patients 3 % of patients have complete heart block. According this study patients with complete block mostly were male same as our study. Gender wise association of CHB also supported in many studies.[18-20]

CONCLUSION

Inferior wall MI has severe adverse effects when combines with complete AV nodal heart block. Severity of disease was significantly associated with gender. Almost all times infarct related artery was dominant right coronary artery.

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