

IN-HOSPITAL EARLY COMPLICATIONS IN DIABETICS VS NON DIABETICS WITH ACUTE ST ELEVATION MYOCARDIAL INFARCTION AGE GROUP 30-70 YEARS

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ABSTRACT

Objective: To determine in hospital early complications in diabetics' vs non diabetics with acute ST elevation myocardial infarction.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: The study was conducted in emergency departments and adult cardiology wards of Armed Forces Institute of Cardiology/National Institute of Heart Diseases, from Aug to Nov 2019.

Methodology: A comparative cross sectional study was conducted on 380 patients (190 patients with diabetes and 190 patients without diabetes) who presented with acute ST-Elevation MI in age group 30 to 70 years to emergency department of Armed Forces Institute of Cardiology/National Institute of Heart Disease during specified period. Patients with rescue PCI and new onset of LBBB were also included. Patients with age group lesser than 30 years or greater than 70 years with STEMI were excluded. Sampled with consecutive non probability technique in patients was assessed with ECG, cardiac enzymes, transthoracic echocardiography, renal Doppler and RFTs. All patients were admitted in wards and were followed up during hospital stay. Patients were evaluated and their record of Primary PCI and thrombolysis was also noted. Data was entered and analyzed with SPSS-23.

Results: A total of 380 patients with STEMI were included in this study consisting of 292 (76.8%) male and 88 (23.1%) female from 30 to 70 years. The patients were divided in two groups i.e. diabetic and non-diabetic, 190 patients were included in each group. It was found that frequency of ST-Elevation MI was higher in diabetic group as compared to non-diabetic group. All the patients were analyzed for complications occurred after ST-Elevation MI. LV failure, Brady arrhythmias, atrial fibrillation, post MI angina and cardiogenic shock were the main complications noted. It was found that all these complications are more in diabetic group post MI angina which occurred most frequently in non-diabetic group.

Conclusion: In our study we observed that left ventricular failure and arrhythmias were the major complications. Mortality was higher in diabetic patients than non-diabetic patients. In both groups PPCI and SK reduced mortality. Post MI angina were found more frequent in non-diabetic group.

Keywords: Complications, Diabetic, In hospital, Mortality, Non-diabetic, Streptokinase.

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INTRODUCTION

Acute Myocardial Infarction (AMI) can be considered as a potential epidemic for mankind¹. The incidence of coronary artery disease is rising in Pakistan¹. The acute coronary syndrome includes unstable angina, non-ST segment elevation MI (NSTEMI) and ST segment elevation MI (STEMI)². Diabetes mellitus is one of the six primary risk factors identified for MI³, others being dyslipidemia, smoking, male gender, hyperten-

sion and family history of atherosclerotic arterial disease^{1,4}. Diabetes mellitus is a metabolic disorder which increases the rate of atherosclerosis progression of vascular occlusion⁴. Even after prompt PPCI and thrombolysis the after-math of diabetic patients is still worse than the non-diabetics, indicating post PCI and post thrombolysis impaired left ventricular function and prognosis⁵. The aim of PCI and thrombolysis in acute MI is early and complete myocardial reperfusion. Incomplete or failed reperfusion is associated with increased risk of complications⁶. Analysis of ST-segment resolution on ECG, after fibrinolytic

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therapy, in cases of ST elevation myocardial Infarction offers an attractive and cost effective solution to assess coronary reperfusion⁷. Whereas coronary angiogram is a marker for epicardial reperfusion, ST segment resolution offers a better reflection of micro vascular reperfusion⁸. Although successful PCI and thrombolysis of the epicardial vessel is necessary for good prognosis, but the micro-vascular flow more strongly correlates with the outcome⁹. ST segment is therefore a better indicator of prognosis, and provides information, which cannot be assessed on basis of coronary angiogram alone¹⁰. In fact Schroeder *et al* reported that absence of ST segment resolution was the most powerful independent predictor of early mortality ($p=0.0001$)⁶. ST resolution can also be used as a tool to identify candidates for early invasive procedures such as PTCA, who are at risk of developing complications because of non-resolution of ST segment after initial thrombolytic therapy. Since ECG is widely available even in developing nations, it is important to establish its effectiveness as a tool for assessing reperfusion as it will offer the cheapest alternative for assessing recovery and myocardial salvage¹¹.

The aim of our study was to correlate the incidence of complications with diabetes by using ST segment resolution as a tool, thereby reinforcing the role of incomplete ST-resolution as a marker of worse clinical outcome in cases of diabetes with ST-elevated myocardial Infarction in our population. The purpose of this study was to document the complications especially the MACE (major Adverse Cardiovascular Events) and other complications in diabetic and non-diabetic patients after acute ST elevation myocardial infarction in age group from 30 year to 70 years in our institution.

METHODOLOGY

A comparative cross sectional study was conducted on 380 patients (190 patients with diabetes and 190 patients without diabetics) who presented with Acute ST-Elevation MI in age group 30 to 70 years to emergency department of Armed Forces Institute of Cardiology/National

Institute of Heart Disease during specified period. Mean age was 53.34 ± 8.38 years as shown in table-I. Patients with rescue PCI and new onset of LBBB were also included. Patients with STEMI age lesser than 30 years or greater than 70 years and patients who has ST elevation due to other reasons like early repolarization, LV hypertrophy, Brugada syndrome and hyperkalemia were excluded. Patients presented with non ST elevation MI and unstable angina were also excluded. Acute ST elevation MI was considered on ECG by ST elevation of 1 mm or more in two or more than two contiguous leads, often with reciprocal ST depression in the contra lateral leads. In lead V2 to V3 ST segment elevation of at least 2mm in men older than 40 years and 2.5 mm in men younger than 40 years, and 1.5 mm in women was taken as significant for acute STEMI^{22,24}.

Sample with consecutive non probability technique were taken and patients were assessed with ECG, cardiac enzymes, transthoracic echocardiography, renal Doppler and RFTs. All patients were admitted in wards and were followed up during hospital stay. Patients were evaluated and history of Primary PCI and thrombolysis was also noted. Data was entered and analyzed with SPSS-23.

Continuous variables were expressed as mean, standard deviation (SD) and qualitative data were presented as percentage and frequencies. Chi-square test was used to determine any significant difference between two groups. A p -value of less than 0.05 was considered significant. The statistical analysis was performed with SPSS software.

RESULTS

A total of 380 patients with STEMI were included in this study consisting of 292 (76.8%) male and 88 (23.2%) females from 30 to 70 years. The patients were divided in two groups i.e. diabetic and non-diabetic, 190 patients were included in each group as shown in table-I. All the patients were analyzed for in hospital early complications between the two groups on the basis of ECG finding, cardiac enzymes, Trans-

thoracic echocardiography, renal doppler and RFTs. It was found that patients treated with primary PCI or Streptokinase the mortality was

Patients who were not treated with PPCI or SK in non-diabetic group mortality was 3 (16.6%) while in diabetic group mortality was 4 (18.1%)

Table-I: Demographic data at the time of presentation.

Demographic characteristics	Sample size 190 Non Diabetic		Sample size 190 Diabetic	
	Frequency	Percentage	Frequency	Percentage
Mean \pm Age	53.34 \pm 8.38			
Gender				
Male	160	84.14%	146	76.6%
Female	30	15.9%	44	23.4%
Family History	36	18.2%	28	14.9%
Smoker or ex-smoker	95	50 %	85	44.7%

Table-II: Age wise distribution of STEMI from 30 to 70 year.

Age wise Distribution	Non Diabetic		Diabetic	
	Frequency	Percentage	Frequency	Percentage
30 to 40 years	06	3.1%	07	3.7%
41 to 50 years	22	11.6%	30	15.7%
51 to 60 years	68	35.8%	81	42.6%
61 to 70 years	94	49.5%	72	37.9%

Table-III: Comparison of complications in diabetic vs non diabetic patient after STEMI.

Parameter	Non diabetic		Diabetic	
	Frequency	Percentage	Frequency	Percentage
1.Mechanical				
VSR	1	0.5%	3	1.57%
Acute MR	2	1.05%	4	2.1%
Ventricular anurysem	-	-	1	0.5%
LV failure	24	12.98%	40	21.05%
RV failure	8	4.2%	12	6.3%
2. Arrhythmias				
a.Bradyarrhythmias				
1st degree AV block	23	12.1%	31	16.3%
2nd degree AV block (mobits 1)	13	6.8%	21	11.05%
2nd degree AV block (mobits 2)	2	1.05%	4	2.1%
3rd degree AV block	8	4.2%	14	7.36%
SND	19	10%	27	14.2%
LBBB	2	1.05%	3	1.57%
b.Tachyarrhythmias				
SVT	4	2.1%	5	2.63%
a.Flutter	2	1.05%	2	1.05%
a.Fibrillation	18	9.47%	23	12.10%
3.Others complications				
Early pericarditis	9	4.76%	11	5.8%
Cardiogenic shock	17	8.9%	22	11.5%
Post mi angina	41	21.6%	36	18.9%
Death	6	3.1%	9	4.7%

p-value = 0.05

lesser than those not treated with PPCI or streptokinase (non-diabetic group mortality was 1.74% while in Diabetic group mortality was 2.97%).

as shown in table-IV. It was also found that frequency of ST-Elevation MI is higher in diabetic group as compared to non-diabetic group. All the

patients were analyzed for complications occurred after ST-Elevation MI. LV failure, Brady arrhythmias, atrial fibrillation, post MI angina and cardiogenic shock were the main complications noted. It was found that all these complications are more in diabetic group except ventricular tachycardia and post MI angina which occurred most frequently in non-diabetic group. LV failure in

another study abroad (27%)¹³. This difference in percentage compared with a local study from Karachi can be related with the status of diabetes and its management in different areas of the country¹⁴⁻¹⁶. In age group 30-40 in greater percentage of diabetic patients were presented with STEMI as compared to non-diabetic group which shows that MI is not only common in advance

Table-IV: Comparison of mortality in diabetic vs non diabetic patients admitted with stemi with and without PPCI or streptokinase.

	Non Diabetic 190 patients	Mortality	Diabetic 190 patients	Mortality
Treated With PPCI OR SK	172	3 (1.74%)	168	5 (2.97%)
Not Treated With PPCI or SK	18	3 (16.6 %)	22	4 (18.1%)
Total	190	6 (3.15%)	190	9 (4.7%)

diabetic patients was 21% while in non-diabetic group it was 12.9%. Among Brady arrhythmias first and second degree AV blocks were found more frequently in diabetic group that is 16.3% and 11% respectively. Among tachyarrhythmias atrial fibrillation was found more frequent in diabetic group 12% as compared to non-diabetic group that is 9.47%. Other complications including early pericarditis and cardiogenic shock were found more frequent in diabetic group while post MI angina happened more often in non-diabetic group that is 41 (21.57%) as compared to diabetic group that is 36 (18.9%). All these details have been shown in table-III. Similarly mortality was also higher in diabetic group that is 9 (4.7%) than nondiabetic group that is 6 (3.15%) as shown in table-IV.

DISCUSSION

A total of 380 patients with STEMI were investigated in this study out of which 160 (42.1%) were male and 30 (7.9%) were female. Mean age was 53.34 ± 8.38 years. The demographic characteristic of the study population were showing no significant difference. Out of 190 nondiabetic patients, 160 (84.14%) were males and 30 (15.9%) were females. This number is about 10% lower than patients admitted with AMI in Karachi (43%)¹². However, number of diabetics in STEMI observed in our study were almost similar to

age among diabetic patients but also in age group lesser than 40 years¹⁷. The most significant complications observed during our study were left ventricular failure, arrhythmias, cardiogenic shock and death. All these complications were more common in diabetic group. These results were almost similar to earlier study conducted in Pakistan¹⁸⁻²⁰. Another study conducted in Greece, abroad showed almost similar results¹⁶. During our study post MI angina was more common in non-diabetic patients which is against other studies conducted²¹. Those study showed similar occurrence of these complications in both groups²²⁻²³, therefore it needs further study to clarify about the existence of these complications in these two groups. In most studies the history showed that younger patient had first sign of heart disease one to two days back and they often ignored it and not consider themselves to be victim of heart disease at this age which leads to increase in hospital mortality in this age²⁴.

CONCLUSION

In our study we observed that left ventricular failure and arrhythmias were the major complications. Mortality was higher in diabetic patients than non-diabetic patients. In both groups, PPCI and SK reduced mortality. Post MI angina was found more frequent in non-diabetic group. However further research in this regards

maybe required. Moreover, it can be seen that Diabetes mellitus can cause more post-MI complications in our population as compared to those in non-diabetic patients; therefore it is also important to decrease its incidence, as it is a modifiable risk factor.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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