

A Study of First Episode of Acute Myocardial Infarction in Type 2 Diabetes Mellitus Patients

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Abstract: Background & objectives: Diabetes mellitus, both insulin and non insulin dependent, is an independent risk factor for coronary artery disease which have a larger infarct size, atypical ischemic symptoms and more post infarct complication than non diabetic patients. So the present study was undertaken with following objectives: (1) To study occurrences of various ischemic symptoms, complications and mortality between diabetics and non diabetics. (2) To find out the relation between duration of diabetes, glycemic control and mortality due to first episode of acute myocardial infarction. Methods: Total 100 cases of acute myocardial infarction included comprising 50 type 2 diabetic patients and 50 non diabetic patients. Patients having first episode of acute myocardial infarction and who is already known case of diabetes mellitus were included. Results: Highest incidence of first episode of acute myocardial infarction in diabetics was occurring at earlier age than non diabetics and more incidences in obese persons and diabetic females. There was less frequent occurrence of chest pain and perspiration in diabetics. Higher incidence of recurrent angina, bundle branch block, atrio-ventricular block and heart failure was noted in diabetics than non diabetics. 30 days mortality was higher in patients having Random blood sugar >198 gm% on admission and diabetes since more than 5 years. Interpretation & conclusion: In the present study, the overall conclusion has been made that in diabetic patients acute myocardial infarction occurs at earlier age, there are atypical ischemic symptoms and also higher incidence of complications and higher mortality rate. So in every patient of acute myocardial infarction glycaemia status should be assessed on admission and hyperglycaemia should be aggressively treated. [Vegad A et al NJIRM 2012; 3(3) : 11-14]

Key Words: Coronary artery disease, Acute myocardial infarction, Diabetics, Non diabetics

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Introduction: The 20th century shows unparalleled increase in life expectancy and major shift in the cause of illness and death throughout the world. During this transition, cardiovascular diseases have become the most common cause of death worldwide. A century ago cardiovascular diseases accounted for less than 10 % of all the deaths. Today, it accounts for approximately 30 percent of death worldwide including 40 % in high income countries. Driven by industrialization, urbanization and associated life style changes, this ongoing transition is occurring worldwide among all races, ethnic groups and cultures at even faster rate than the last century¹.

Importance of diabetes mellitus as a public health problem becomes even more apparent due to complication of long term diabetes mellitus chiefly vascular in nature. These leads to marked disability

due to involvement of large blood vessels in brain, heart, kidney and extremities and small blood vessels in eyes. Atherosclerosis accounts for about 80 % of all deaths, of which roughly three quarters are due to coronary artery diseases and reminder due to cerebrovascular or peripheral vascular events. As the prevalence of diabetes is estimated to be doubled by the year 2025².

Diabetic patients are more likely to suffer myocardial infarction, have greater burden of Coronary artery disease (CAD), have larger infarct size and suffer more post infarct complications. Diabetics are more likely to have atypical ischemic symptoms. Additionally "silent ischemia" resulting from autonomic nervous system dysfunction, is more common in diabetics accounts for up to 90% of their ischemic episodes³.

The treatment of diabetes with CAD must include aggressive risk factor management. Diabetics have greater morbidity and mortality associated with revascularization, have increased risk of restenosis after percutaneous coronary intervention (PCI) and likely have improved survival when treated with surgical bypass compared with PCI for multivessel CAD. Subgroup analysis of patients with ST-segment elevation MI (STEMI) in global utilization of Streptokinase and Tissue plasminogen activator (tPA) for Occluded coronary arteries (GUSTO-1) trial demonstrated significantly higher all cause mortality at 30 days compared with non diabetics. The organization to assess strategy for ischemic syndromes (OASIS) registry of patients with unstable angina/non STEMI, observed an increased rate of post MI complications and mortality among diabetics compared with patients without diabetes during 2 years of follow up. Global registry of acute coronary events (GRACE), revealed in hospital case fatality rates for patients with diabetes with ACS were almost twice as high as those of without diabetes^{4,5,6,7}.

This comprehensive clinical study of first episode of acute myocardial infarction in type 2 diabetic patients and non diabetic patients was undertaken to compare the age and sex incidence, clinical features, various complications and mortality in both groups.

Material and Methods: After taking permission of institutional ethical committee, the present study was carried out with aims of evaluating clinical course and prognosis of first episode of acute myocardial infarction in type 2 diabetic patients and non diabetic patients in Department of Medicine, Shri M. P. Shah Medical College and Guru Gobind Singh Hospital, Jamnagar during period from January 2009 to March 2010. Study included 100 cases of first episode of acute MI, comprising 50 cases of type 2 diabetic and 50 cases of non diabetic patients.

Exclusion criteria

- (1) Patient having impaired glucose tolerance.
- (2) Patient having diabetes due to secondary causes.
- (3) Patient having myocardial infarction of more than 7 days at time of admission.

(4) Patient having past history of ischemic heart disease

A surface 12 lead ECG with additional right precordial leads V₃R, V₄R was done at the time of admission in all cases. ECG showing significant ST segment elevation (>1mm in limb leads and >2 mm in chest leads) was considered for diagnosis of acute MI. Random blood sugar (RBS) of all the patients at the time of admission were measured. All cases were studied in detail and followed up for 30 days after admission to evaluate prognostic outcome. Chi-square test was used to determine the significance of difference between proportion of variables. The mean \pm S.D. was calculated for continuous variables. Difference between both groups were analysed for statistical significance. P value less than 0.05 was taken as statistically significant.

Results: The study was carried out on 100 cases of first episode of acute MI, comprising type 2 diabetics and non diabetics, 50 cases of each and showed following results:-

- The highest incidence of first episode of acute MI in diabetics was in age group Of 41-50 years and mean age in diabetic group was 48.2 years.
- The highest incidence of first episode of acute MI in non diabetics was in age group of 51-60 years and mean age in non diabetic group was 53.4 years.
- This study showed incidence of acute MI in diabetic females (n=20 or 40%) was more than diabetic males (n=12 or 24%), which was statistically significant (P<0.05).
- Presence of family history of ischemic heart disease (In diabetics: n=13 or 26%, In non diabetics: n=11 or 22%) and hypertension (In diabetics: n=10 or 20%, In non diabetics: n=7 or 14%) was not statistically significant but presence of family history of diabetes mellitus (In diabetics: n=12 or 24%, In non diabetics: n=4 or 8%) was statistically significant.
- There was more prevalence of obesity in diabetic (n=21 or 42%) than non diabetic patients (n=13 or 26%) and there was more prevalence of tobacco smoking/chewing in non diabetic (n=38 or 76%) than diabetic patients (n=14 or 28%), these differences in both group was statistically significant.

Table: 1 Presenting symptoms in diabetic and non diabetic patients

Symptoms	Non Diabetics n = 50		Diabetics n = 50		P value
	No.	%	No.	%	
Chest pain	42	84	30	60	< 0.05
Perspiration	35	70	28	56	< 0.05
Nausea/Vomiting	10	20	16	32	> 0.05
Breathlessness	13	26	22	44	> 0.05
Palpitation	8	16	6	12	> 0.05
Syncope	8	16	12	24	> 0.05
Unconsciousness	1	2	2	4	> 0.05

Table: 2 Complications during hospital stay in diabetic and non diabetic patients

Symptoms	Non Diabetics n = 50		Diabetics n = 50		P value
	No.	%	No.	%	
Recurrent angina	4	8	9	18	< 0.05
Reinfarction	2	4	3	6	> 0.05
Acute left ventricular failure	4	8	10	20	< 0.05
Ventricular tachycardia	6	12	10	20	> 0.05
Atrial fibrillation	7	14	8	16	> 0.05
Atrio-Ventricular block	11	22	22	44	< 0.05
Right or Left Bundle branch block	4	8	9	18	< 0.05
Complete heart block	7	14	14	28	< 0.05

Table: 3 Mortality rate in diabetic and non diabetic patients

Symptoms	Non Diabetics		Diabetics		P value
	Mean	%	Mean	%	
In Hospital Mortality	4	8	9	18	< 0.05
30 days mortality	8	16	16	32	< 0.05

Table: 4 Duration of diabetes and 30 days mortality rate in diabetic patients

On admission RBS	Diabetics N=50		Mortality	
	No.	%	No.	%
< 5 years	25	50	05	20
> 5 years	25	50	11	44

Table: 5 On admission RBS and 30 days mortality rate in diabetic patients

Duration of diabetes	Diabetics N=50		Mortality	
	No.	%	No.	%
> 198 mg%	21	42	9	18
< 198 mg%	29	58	4	8

Discussion: In the present study, we find that first episode of acute myocardial infarction occurs at earlier age in diabetic patients and more incidences in female diabetic patients and obese persons. In diabetic patients there are atypical ischemic symptoms like lack of chest pain and perspiration and also higher incidence of complication like recurrent angina, heart failure, bundle branch block, heart block. We also found that there is higher mortality rate in patients who have high random blood sugar on admission and having long history of diabetes. Patients having long duration of diabetes and having higher random blood sugar (RBS > 198 mg %) had a higher 30 day mortality. In present study the less occurrence of chest pain and perspiration in diabetics is statically significant, while Richman P B⁸ in their study found no difference in clinical presentation of patient of acute MI with or without diabetes. According to study conducted by Mackenzie et al.⁹ only acute LVF is more common among diabetics. According to study conducted by K. Malmberg et al.¹⁰ high degree AV block was more common among diabetics. D.K.McGuire et al.¹¹ in their study founded statistically significant higher incidence of complication like 2nd or 3rd degree heart block, atrial fibrillation or flutter, recurrent ischemia and heart failure in diabetics compared to non diabetics. J. Sala t al.¹² in their study found that 30 days mortality in patient group with admission RBS more than 198mg% is statistically higher than those having RBS less than 198mg%. D.K.McGuire et al¹¹,

L. and K. Mlemberg et al¹⁰.also found in their study higher 30 days mortality rate in diabetics. Several factors probably underlie cardiovascular complications in diabetic patients like coronary atherosclerosis, prolonged hypertension, chronic hyperglycemia, microvascular disease, glycosylation of myocardial proteins and autonomic neuropathy. Conclusion: : In the present study, the overall conclusion has been made that in diabetic patients acute myocardial infarction occurs at earlier age with atypical ischemic symptoms. There is also higher incidence of complications and higher mortality rate in patients who have high random blood sugar on admission and having long history of diabetes. So in every patient of acute myocardial infarction glycemic status should be assessed on admission regardless of diabetic history and hyperglycaemia should be aggressively treated whether diabetes is present or not.

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