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Myocardial Infarction in Diabetics, Pre-Diabetics and Non-Diabetics: A Prospective Study

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ABSTRACT

Background: Vascular diseases are one of the major public health problems in the developed world, resulting in devastating symptoms involving coronary artery occlusion, cerebrovascular accidents, peripheral vascular insufficiency, and acute myocardial infarction (AMI). These diseases affect millions of people annually, resulting in extensive morbidity and mortality. It is a well-established fact that individuals with pre-diabetes and diabetes are at a higher risk of cardiovascular events including myocardial infarction. The other risk factors for development of coronary artery disease include hypertension, obesity, hyperlipidemia, family history and sedentary life style. In this study we analyzed the data of all patients admitted for the first time for acute myocardial infarction (MI) and evaluated the load of non-diabetics, prediabetics and diabetics among them. In this study patients were analyzed for their biochemical and physiological parameters and cardiac markers at the time of admission. **Methods:** This was a prospective cohort study jointly conducted by department of physiology and medicine of a tertiary care medical college situated in an urban area. The patients admitted in intensive care unit and diagnosed to be having acute myocardial infarction were included in this study on the basis of a predefined inclusion and exclusion criteria. Various physiological (pulse rate, blood pressure, heart rate and respiratory rate) and biochemical (HbA1c, Plasma glucose, lipid profile and cardiac markers) were studied. Number of diabetics, pre-diabetics and non-diabetics landing in myocardial infarction and correlation of abnormal blood glucose level to severity of myocardial infarction was studied. The statistical analysis was done using SSPE 21.0 software. P value less than 0.05 was taken as statistically significant. **Results:** Total 89 patients were included in this study. Out of these 89 patients 34 (38.20%) patients were non- diabetic whereas 33 (37.08%) and 22 (24.72%) patients were pre-diabetic and diabetic respectively. The mean age of diabetic, pre-diabetic and non-diabetic patients were found to be comparable with no statistically significant difference amongst them (P>0.05). Gender distribution showed that there were 71 (79.78) males and 18 (20.22%) females with a M:F ratio of 1:0.25. Heart rate as well as systolic and diastolic blood pressure and total cholesterol levels were found to be higher in diabetic patients as compared to pre diabetic and non-diabetic population. Analysis of myocardial enzyme (CK-MB and Troponin I) levels showed that they were also higher in diabetic patients as compared to pre-diabetic and non- diabetic population. Mortality was found to be statistically significantly high in patients with diabetes (P<0.05). **Conclusion:** The diastolic blood pressure, total cholesterol, triglyceride, LDL cholesterol CK-MB, Troponin I showed an increase in diabetic group of AMI patients. Though the mean age of myocardial infarction was found to be comparable in diabetics, pre diabetics and non-diabetic patients there was statistically significant higher mortality rates in diabetic patients with myocardial infarction.

Keywords: Diabetes, Myocardial Infarction, Myocardial Enzymes, Mortality.

INTRODUCTION

Preeclampsia is one of Vascular diseases are one of the major public health problems in the developed world, resulting in devastating symptoms involving coronary artery occlusion, cerebrovascular disorders, peripheral vascular insufficiency, and acute myocardial infarction (AMI).[1] These diseases affect millions of people annually, resulting in extensive morbidity and mortality.[2] Acute myocardial infarction (AMI) is one of the major causes of mortality and morbidity in the world.[3] According to World Health Organization (WHO health statistics 2011) data, AMI is the leading cause of death in the world. 3.8 million men and 3.4 million women worldwide die each year from Acute Myocardial Infarction (Atlas of death from cardiovascular disease WHO, 2011). Myocardial infarction (MI) is so common in developing countries such as India, by 2007, 32% death were due to ischemic heart disease (IHD) alone.[4] In India MI has become the leading cause of death.[5] By 2015, MI has become a major health issue and mortality burden in India.[6]

Diabetes mellitus (DM) refers to a group of common metabolic disorders characterized by chronic hyperglycemia with disturbances of carbohydrate,

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fat and protein metabolism associated with absolute or relative deficiencies of secretion or insulin action. All forms of diabetes lead to the development of diabetes-specific microvascular pathology in the retina, renal glomerulus and peripheral nerve. As a consequence of its microvascular pathology, diabetes is a leading cause of blindness, end stage renal disease and a variety of debilitating neuropathies7. Diabetes is associated with accelerated atherosclerotic macrovascular disease affecting arteries that supply the heart, brain and lower extremities. As a result, patients with diabetes have a much higher risk of myocardial infarction, stroke and limb amputation.[8] Hyperglycemia and insulin resistance both seem to have important roles in the pathogenesis of macrovascular complications. Cardiovascular disease (CVD) is one of the many complications of diabetes mellitus along with retinopathy, nephropathy, neuropathy, peripheral vascular disease (PVD), stroke and other sequalae of macro and microvascular pathology.[9]

Insulin resistant DM can be preceded by long term abnormality in glucose homeostasis which is called pre-diabetes. Recently, pre-diabetes has been suggested to have an increased risk of cardiovascular diseases. Pre- diabetic syndrome is defined as a state of fasting plasma glucose with ≥ 100 mg/dl (5.6 mM/L) but ≤ 125 mg/dl (7.0 mM/L) and/or post prandial 2-hour plasma glucose with ≥ 140 mg/dl (7.8 mM/L) but ≤ 199 mg/dl (11.1 mM/L).[10] Department of Health and Human Services (HHS) and the American Diabetes Association (ADA) from 27 March 2002 are using the new term pre-diabetes to describe an increasingly common condition in which blood glucose levels are higher than normal but not yet diabetic such as impaired glucose tolerance and impaired fasting glucose. Most people with this condition go on to develop type 2 diabetes within 10 years.

The prediabetic patient load in India was around 85.6 million in 2003 and it is expected to rise up to 132 million by the year 2025.[11] Epidemiological studies, including the Paris Prospective Study have shown that pre-diabetes confers an increased risk of cardiovascular disease (CVD). However, the exact load of normoglycemic form of MI is not clearly known. Considering that India has been declared as a diabetic capital of the world it deemed pertinent to assess the exact load of prediabetics and non-diabetics landing in myocardial infarction.[12]

Hence, in the present study we analyzed the data of all patients admitted for the first time for acute myocardial infarction (MI) and evaluated the load of non-diabetics, pre diabetics and diabetics among them. We studied the acute MI patients admitted to our institute in the year 2016 -2017 and patients were analyzed for their biochemical and physiological parameters and cardiac markers at the time of admission.

MATERIALS AND METHODS

The present study was carried out in the department of Physiology and Medicine of a tertiary care medical college situated in an urban area. The study was carried out over a period of 1 year from June 2016 to June 2017. A total of 89 Patients admitted in Coronary Care Unit of our hospital with the diagnosis of Acute Myocardial Infarction (AMI) were included in this study on the basis of a predefined inclusion and exclusion criteria. Institutional ethical committee approved the study and an informed written consent was obtained from all the patients or their caretakers.

Demographic details of all the patients were noted and a through clinical examination was done. Relevant physiological and biochemical parameters were noted in a proforma. Various physiological parameters such as pulse rate, respiratory rate, heart rate and blood pressure were recorded in all patients. Biochemical parameters such as HbA1C, Plasma Glucose, Serum Lipid profile and cardiac markers such as CK-MB and Troponin I were also done in all the cases. Patients were labelled as normal (SBP < 120 or DBP <80), pre-hypertension (SBP 130-139 or DBP 85-89), stage-I hypertension (SBP 140-159 or DBP 90-99) and stage-II hypertension (SBP≥ 160 or DBP≥ 100) on the basis of blood pressure readings.

Inclusion Criteria

The diagnosis of AMI was made in accordance with the WHO criteria on the presence of two of the following three features.

1. A history of ischemic type of chest pain or discomfort- The pain of AMI is similar to that of angina pectoris but is more severe and longer lasting (more than 30 minutes), not relieved by sublingual glyceryl nitrate (GTN) and is frequently accompanied by dyspnea, orthopnea, diaphoresis, nausea, vomiting, tachycardia and a feeling of impending death.
2. Electrocardiographic Criteria: The ECG criteria for the diagnosis of AMI as outlined in the MILIS study are the presence, in the setting of chest pain, of any one of the following

I- New, or presumably new, Q waves (at least 30ms wide and 0.20mV deep) in at least 2 leads from anyone of the following (a) Leads II, III or aVF (b) Leads V1 through V6 (c) Leads I and aVL

II- New or presumably new, ST-segment elevation or depression (≥0.10 mV measured 0.02 sec. after the J point) in two contiguous leads of the above-mentioned lead combination.

III- New or presumably new, complete left bundle branch block (LBBB)

3. Diagnostic rise in serum cardiac marker. Creatine Phosphokinase- myocardial isoenzyme (CK-MB) and cardiac troponin after the onset of the pain.
4. Patients admitted within 24 hours of onset of symptoms.

We have selected diagnosed cases of Acute Myocardial Infarction (AMI), which were fulfilling the above criteria. The patients enrolled in this study were further divided into non-diabetics, pre-diabetics and diabetics on the basis of following criteria

1. Non-Diabetics - Fasting plasma glucose < 100 mg/dl (5.6 mM/L) and/or post prandial 2-hour plasma glucose < 140 mg/dl]
2. Prediabetics: Fasting plasma glucose with ≥ 100 mg/dl but ≤ 125 mg/dl (7.0 mM/L) and/or post prandial 2-hour plasma glucose ≥ 140 mg/dl (7.8 mM/L) but ≤ 199 mg/dl (11.1 mM/L)].
3. Diabetics: Fasting plasma glucose ≥ 126 mg/dl and/ or post prandial 2-hour plasma glucose ≥ 200) as assessed from their fasting and/or postprandial glucose values.

Exclusion Criteria

- Other Conditions causing ST segment elevation like pericarditis, myocarditis, left bundle branch block, left ventricular aneurysm etc.
- Any other associated heart disease
- Pregnancy
- Subjects who have not given the written informed consent

Statistical analysis was done, using the Statistical Package for Social Science (SPSS 21.0) for Windows Software and Microsoft Excel 2010.The results were expressed as Mean ± Standard Deviation (SD). Unpaired t – test was used for comparison between the groups and P value less than 0.05 was taken as significant.

RESULTS

The present study was undertaken to determine the correlation of abnormal glucose levels on the severity of myocardial Infarction. The levels of glycohaemoglobin (HbA1C), plasma fasting glucose (F) and post prandial (PP), creatine kinase-MB isoenzyme (CK-MB), and troponin I (cTnI), lipid profile (triglyceride, total cholesterol, LDL cholesterol, VLDL cholesterol, HDL cholesterol), blood pressure, pulse rate, respiratory rate was evaluated. 89 patients were divided in three groups nondiabetic, prediabetics and diabetics and values were compared between them.

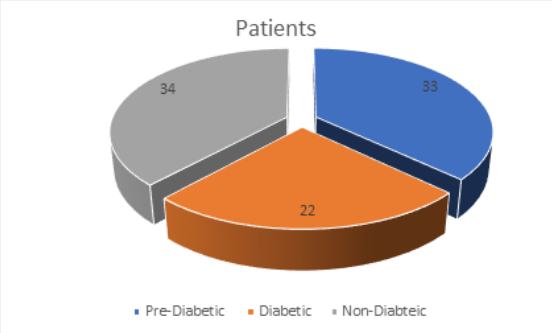

Figure 1: Distribution of patients in non-diabetic, diabetic and prediabetic groups.

The mean age of the AMI patients in nondiabetic group (n=34) was 57.26±8.25 years, in prediabetics group (n=33) was 56.76±6.75 years and in diabetic group (n=22) age was 59.64±5.69 years. The mean age of the patients in 3 groups was found to comparable with no statistically significant difference (P>0.05)

Table 1: Mean age of nondiabetic, prediabetic and diabetic.

Groups	Age (Years) (Mean±SD)	P Value
Nondiabetic (N = 34)	57.26±8.25	0.784
Prediabetic (N = 33)	56.76±6.75	0.106
Diabetic (N = 22)	59.64±5.69	0.244

Out of 34 patients of AMI in nondiabetic group 31 were males (91.17%) and 3 were females (8.83%). Out of 33 patients of AMI in prediabetic group 26 were males (78.78%) and 7 were females (21.22%). Out of 22 patients of AMI in diabetic group 14 were males (63.64%) and 8 were females (36.36%).

Table 2: Sex distribution of nondiabetic, prediabetic and diabetic

	Male	Female
Nondiabetic (N = 34)	31 [91.17%]	3 [8.83%]
Prediabetic (N = 33)	26 [78.78%]	7 [21.22%]
Diabetic (N = 22)	14 [63.64%]	8 [36.36%]

In nondiabetic group (n=34) mean heart rate /minute was 81.32±10.13, for prediabetics group (n=33) mean heart rate was 84.36±9.04 and in diabetic group (n=22) mean heart rate was 86.00±11.58.
In nondiabetic group (n=34) mean systolic blood pressure was 129.94±22.58 mm of Hg and mean diastolic blood pressure was 79.06±9.51 mm of Hg , In prediabetics group (n=33) mean systolic blood pressure was 131.82±23.89 mm of Hg and mean diastolic blood pressure was 80.30±12.82 mm of Hg and in diabetic group (n=22) mean systolic blood pressure was 143.18±38.01 mm of Hg and mean diastolic blood pressure was 88.73±12.91 mm of Hg.
Diastolic blood pressure (DBP) was significantly higher in diabetics as compared to prediabetics or nondiabetics. Findings were not significant between prediabetics and nondiabetic [Table 3] on statistical evaluation.

In nondiabetic group (n=34) respiratory rate /minute was 25.94±6.37, in prediabetics group (n=33) respiratory rate was 26.42±8.05 and in diabetic group (n=22) respiratory rate was 30.36±12.30. The diastolic blood pressure was significantly high as compared to diastolic blood pressure of prediabetic and non-diabetic patients (P<0.05). Rest of the parameters were found to be comparable in all 3 groups with no statistically significant difference (P>0.05).

Table 3: Physiological parameters of nondiabetic, prediabetic and diabetic groups.

Variables	Nondiabetic (N = 34) (Mean±SD)	Prediabetic (N = 33) (Mean±SD)	Diabetic (N = 22) (Mean±SD)
Heart Rate (per minute)	81.32±10.13	84.36±9.04	86.00±11.58
Systolic BP (mm of Hg)	129.94±22.58	131.82±23.89	143.18±38.01
Diastolic BP (mm of Hg)	79.06±9.51	80.30±12.82	88.73±12.91
Respiratory Rate (per minute)	25.94±6.37	26.42±8.05	30.36±12.30

In nondiabetic group (n=34) the mean value of HbA1C was 5.01±0.27, in prediabetics group (n=33) HbA1C was 6.07±0.21 and in diabetic group (n=22) HbA1C was 8.46±1.23 [Table 4]. In nondiabetic group (n=34) Fasting blood sugar was 81.35±13.07 and Post prandial blood sugar was 124.50±10.06 , in prediabetics group (n=33) Fasting blood sugar was 112.52±9.06 and Post prandial blood sugar was 171.76±15.70 and in diabetic group (n=22) Fasting blood sugar was 159.14±20.79 and Post prandial blood sugar was 271.36±48.22. Blood Sugar Fasting, Blood Sugar Post Prandial and HbA1c was highly significant (p< 0.05) in diabetics and prediabetics as compared to nondiabetics on statistical evaluation.

Table 4: Glycemic status in nondiabetic, prediabetic and diabetic

Variables	Nondiabetic (N = 34) (Mean±Sd)	Prediabetic (N = 33) (Mean±Sd)	Diabetic (N = 22) (Mean±Sd)
HbA1C (%)	5.01±0.27	6.07±0.21	8.46±1.23
BS(F) (mg /dl)	81.35±13.07	112.52±9.06	159.14±20.79
BS(PP) (mg/dl)	124.50±10.06	171.76±15.70	271.36±48.22

The mean value of Total Cholesterol in nondiabetic group (n=34) was 172.64±37.26, in prediabetics group (n=33) it was 170.70±31.55, and in diabetic group (n=22) it was 178.36±45.31.The mean value of Serum Triglyceride in nondiabetic group (n=34) was 133.82±54.49, in prediabetics group (n=33) it was 151.18±50.15, and in diabetic group (n=22)) it was 158.55±42.63.

The mean value of HDL-Cholesterol in nondiabetic group (n=34) was 36.03±6.43, in prediabetics group (n=33) it was 34.64±4.31, and in diabetic group (n=22) it was 34.55±6.62. The mean value of LDL-Cholesterol in nondiabetic group (n=34) was 113.18±35.97, in prediabetics group (n=33) it was 109.42±29.16, and in diabetic group (n=22) it was 117.45±43.33. The mean value of VLDL-Cholesterol in nondiabetic group (n=34) was 22.94±6.12, in prediabetics group (n=33). It was 26.64±10.00, and in diabetic group (n=22) it was 26.41±7.01.

The lipid profiles of all 3 groups were found to be comparable with no statistically significant difference amongst the groups.

Table 5: Lipid Profile of nondiabetic, prediabetic and diabetics

Parameters	Nondiabetic (N = 34) (Mean±SD)	Prediabetic (N = 33) (Mean±SD)	Diabetic (N = 22) (Mean±SD)
Total Cholesterol (mg/dl)	172.64±37.26	170.70±31.55	178.36±45.31
Serum Triglycerides (mg/dl)	133.82±54.49	151.18±50.15	158.55±42.63
HDL (mg/dl)	36.03±6.43	34.64±4.31	34.55±6.62
LDL (mg/dl)	113.18±35.97	109.42±29.16	117.45±43.33
VLDL (mg/dl)	22.94±6.12	26.64±10.00	26.41±7.01

The mean value of CKMB in nondiabetic group (n=34) was 117.03±77.67, in prediabetics group (n=33) it was 185.96±78.37, in diabetic group (n=22)) it was 195.67±83.21. Serum level of CK-MB was highly significant (p< 0 .001 *) in diabetics and prediabetics compared to nondiabetics. Findings were not significant between prediabetics and diabetic on statistical evaluation.

Table 6: Comparison of Creatine Phosphokinase CK-MB isoenzyme in nondiabetic, prediabetic and diabetics

Groups	Nondiabetic (N = 34)	Prediabetic (N = 33)	Diabetic (N = 22)
CK-MB (U/L)	117.03±77.67	185.96±78.37	195.67±83.21
	Group 1 vs Group 2	Group 2 vs Group 3	Group 3 vs Group 1
P Value	0.001*	0.663	0.001*

The mean value of TROPONIN I in nondiabetic group (n=34) was 1.06±0.48, in prediabetics group (n=33) it was 1.28±0.62, and in diabetic group (n=22) it was 2.52±0.69 [Table 7]. Serum level of TROPONIN-I was highly significant (p< 0 .001*) in diabetics as compared to prediabetics or nondiabetics. Findings are not significant between prediabetics and nondiabetic [Table 7] on statistical evaluation (p value 0.125).

Table 7: Comparison of Troponin I in nondiabetic, prediabetic and diabetic

Groups	Nondiabetic (N = 34)	Prediabetic (N = 33)	Diabetic (N = 22)
Troponin I (ng/ml)	1.06±0.48	1.28±0.62	2.52±0.69
	Group 1 vs Group 2	Group 2 vs Group 3	Group 3 vs Group 1
P Value	0.125	<0.001*	<0.001*

In nondiabetic group (n=34) the mean value of HbA1C was 5.01±0.27, in prediabetics group (n=33) HbA1C was 6.07±0.2 and in diabetic group (n=22) HbA1C was 8.46±1.23. As level of HBA1C

increases there is increase in TROPONIN I levels in three groups. The mean value of TROPONIN I in nondiabetic group (n=34) was 1.06±0.48, in prediabetics group (n=33) it was 1.28±0.62, and in diabetic group (n=22) it was 2.52±0.69.

Table 8: Correlation of HbA1c with TROPONIN-I levels

Groups	Hba1c (%) (Mean±SD)	Troponin I (Ng/ml) (Mean±SD)
Nondiabetic (N=34)	5.01±0.27	1.06±0.48
Prediabetic (N=33)	6.07±0.21	1.28±0.62
Diabetic (N=22)	8.46±1.23	2.52±0.69

Among 34 nondiabetic patients, 12 patients develop CHF, 9 patients develop arrhythmias and 2 patients develop both CHF and arrhythmias. Among 33 prediabetic patients, 15 patients develop CHF, 11 patients develop arrhythmias and 3 patients develop both CHF and arrhythmias. Among 22 diabetic patients, 12 patients develop CHF, 10 patients develop arrhythmias and 5 patients develop both CHF and arrhythmias

Table 9: Complication of MI in three groups

Groups	Congestive Heart Failure	Arrhythmias	CHF And Arrhythmias
Nondiabetic (N=34)	12	9	2
Prediabetic (N=33)	15	11	3
Diabetic (N=22)	12	10	5

Out of 34 nondiabetic patients, hospital stay for 15 patients were less than 7 days and hospital stay for 19 patients were more than 7 days. Among 33 prediabetic patients, hospital stay for 12 patients were less than 7 days and hospital stay for 21 patients were more than 7 days. Among 22 diabetic patients, hospital stay for 6 patients were less than 7 days and hospital stay for 16 patients were more than 7 days

Table 10: Hospital Stay of MI patients of three groups

Groups	Up To 7 Days	More Than 7 Days
Nondiabetic (N=34)	15	19
Prediabetic (N=33)	12	21
Diabetic (N=22)	6	16

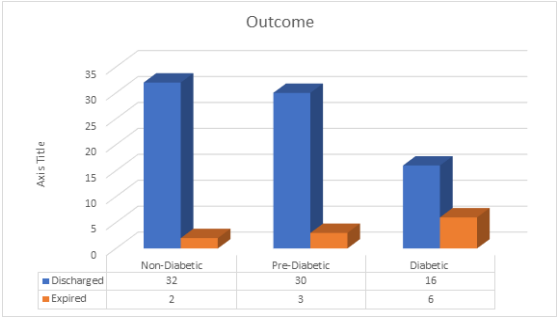

Figure 1: Outcome of patients.

Among 34 nondiabetic patients 32 were improved and discharged and 2 patients were expired. Among 33 prediabetic patients 30 were improved and discharged and 3 patients were expired. Among 22 diabetic patients 16 were improved and discharged and 6 patients were expired [Table 10]. There was more mortality in diabetic patients compared to nondiabetic and prediabetics.

DISCUSSION

In the present study the mean age of the AMI patients in nondiabetic group was 57.26±8.25 years, in prediabetics group 56.76±6.75 years and in diabetic group was 59.64±5.69 years. Out of 34 patients of AMI in nondiabetic group 31 were males (91.17%) and 3 were females (8.83%). Out of 33 patients of AMI in prediabetic group 26 were males (78.78%) and 7 were females (21.22%). Out of 22 patients of AMI in diabetic group 14 were males (63.64%) and 8 were females (36.36%). Our study was found to be in consonance with several population-based studies, Seeman T et al,[13] Deborah RZ et al,[14] Nahid R et al,[15] ; Nishiyama S et al,[16] who reported an increased overall incidence of AMI in men. In India the prevalence has been found to be 65.4 and 47.8 per 1000 males and females respectively.

In our study diabetic cases were 24.72%, normoglycemic cases 38.20 % and prediabetic cases were 37.07%. It was found that the total nondiabetic population (normoglycemic and prediabetic), was around 75% in the present study. These findings were consistent with results of previous studies. The study of Sen K et al,[17] showed 48.4% of all acute coronary syndrome patients were prediabetic and 25% were diabetic. Out of all acute coronary syndrome patients, non-ST elevation myocardial infarction group had 50% prediabetic patients, ST elevation myocardial infarction group had 50% prediabetic patients. So, it is suggested that all patients of acute coronary syndrome should be screened to detect hyperglycemia in early stage to prevent further development of diabetes mellitus and also further cardiovascular events.

In this present study diastolic blood pressure (DBP) was increased in significant amount in diabetics as compared to prediabetics or nondiabetics. This is consistent with many of previous studies by Burgess DC et al,[18] Colhoun HM et al,[19] Ostergren J et al,[20] where it was found that diabetic patients had associated risk factors (hypertension, hyperlipidemia, proteinuria, retinopathy, smoking, family history, etc.

In the present study the serum level of total cholesterol, triglyceride, LDL cholesterol shows an increase in diabetic group when compared with prediabetic or nondiabetic group but this increase is not significant (p>0.05). Hypercholesterolemia is universally accepted as a major risk factor for

atherosclerosis, but at any given concentration of plasma cholesterol, there is variability in the occurrence of cardiovascular events, as it has been shown that the oxidative modification of LDL might be a crucially important step in development of atherosclerotic plaque shown by Heinecke JW et al.[21]

We found that as the level of HbA1c and blood glucose increases there is increase in Troponin I levels in three groups of nondiabetics, prediabetic and diabetic MI patients. This is consistent with the study of Bjornholt JV et al,[22] they demonstrated that patients with elevated fasting blood sugars not diagnostic of diabetes still have an increased long-term risk of adverse cardiac events.

In our study serum level of Troponin is increased in significant amount in diabetics when compared to prediabetics or nondiabetics. Findings of Troponin I are not significant between prediabetics and nondiabetic. This is in agreement with the study by Marfella Raffaele at,[23] that showed that hyperglycemia was associated with higher troponin I levels and larger infarct size as well as myocardial TNF-α, NFκB-activated, caspase-3, and nitro tyrosine levels compared with normoglycemic patients.

Philip R et al,[24] demonstrated that diabetic subjects had a higher incidence of congestive heart failure (relative ratio = 2.2, 95% CI 1.7- 2.8), more adverse indexes of short-term and long-term prognosis and a longer average hospital stay (12.1 vs. 8.9 days, P <0.01). Similar results were depicted by our study also.

The higher blood sugar concentrations in persons with diabetes, including those previously undiagnosed, are highly predictive for poorer outcome both in the hospital and subsequently shown by Dormandy JA et al,[25] Norhammar AM et al,[26] Fava S et al,[27] Malmberg K et al,[28] and Otter W et al.[29] In a report of Vivas D et al,[30] it was found that plasma glucose and first fasting blood glucose levels at the time of admission can predict the adverse outcome of acute coronary syndrome patients.

CONCLUSION

We found that diastolic blood pressure, total cholesterol, triglyceride, LDL cholesterol CK-MB, Troponin I showed an increase in diabetic group of AMI patients. A longer Average hospital stay and higher mortality rates were seen in diabetic patients having MI as compared to non-diabetics and pre-diabetic individuals.

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