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Medicine

Study of Clinical Profile of Acute Myocardial Infarction in Diabetic and Non Diabetic Patients

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| **Abstract** | **Original Research Article** |

Background: In recent years, much attention has been given to the evidence that the concomitant occurrence of hyperglycaemia in patients admitted to intensive care units with an acute myocardial infarction (MI) enhances the risk of mortality and morbidity, whether the patient as DM or not. In some cases, the elevation of sugar could simply be a marker of pre-existing, but not yet detected type 2 diabetes or impaired sugar tolerance (IGT). This may mean that besides being causal, elevated sugar also could be a marker of existing insulin resistance and/or beta-cell failure that may contribute to the poor prognosis through other mechanisms. However, a positive association between hyperglycaemia at the time of the event and subsequent mortality from MI has frequently been reported. Consequently, understanding the possible mechanisms through which hyperglycaemia worsens the prognosis of a MI, as well the effectiveness of its control during acute MI, seems to be of great relevance. *Aim:* To study clinical profile of acute myocardial infarction in diabetic and non-diabetic patients. *Material and methods:* Present study type was a cross sectional observational type of study carried out at Medicine department of tertiary care hospital. A160 patients were included in the study. Patients, both male and female who are having acute myocardial infarction with elevated blood sugar level but previously not diagnosed as diabetic. Registration of patients was done from October 2019 to October 2021. Registration was done when patient got admitted under department of medicine. On registration the patients having exclusion criteria were not taken for the study. Objective of the study was to study clinical profile of acute myocardial infarction in patients with diabetes and non-diabetes. All data was collected and complied in Microsoft excel. Results of continuous (quantitative data) measurement were presented on Mean +/- SD (min-max) and result on categorical (qualitative data) measurements was presented in percentage and proportions (%). *Results:* Two groups were made. Group Diabetic and Non diabetic group. Each group had 80 cases each. Among Diabetic patients, 7 had Anterolateral, 15 had Antero septal, 29 had anterior wall, 27 had inferior wall and 2 had posterior wall myocardial infarction. Among non-Diabetic patients, 8 had Anterolateral, 13 had Antero septal, 27 had anterior wall, 30 had inferior wall and 1 each had posterior lateral and posterior wall myocardial infarction respectively. No statistical significance was seen (p0.87). Among diabetic cases mean EF% was 45.06+9.61, mean Triglycerides was140.5+ 106.9, mean HDL was 43.9+12.72, mean LDL was 89.72+37.72 and mean troponin was 5.9+9.81. Among Non-diabetic mean EF% was 45.26+8.81, mean Triglycerides was106.6+ 44.8, mean HDL was 45.93+10.06, mean LDL was 99.23+29.83 and mean troponin was 3.9+6.55. Except EF% all other parameters showed statistical significance. Among diabetic cases 56 had good outcome and 24 had poor outcome and among non-diabetic cases 70 had good outcome and 10 had poor outcome. Statistical significance was seen (p-0.003). *Conclusion:* Our study was a prospective study conducted to study clinical profile of Acute Myocardial Infarction in Diabetic and Non Diabetic patients. Commonest age group affected was above 60 years and predominantly males. Common clinical feature presented was chest pain, breathlessness, weakness and palpitations. It was seen that modifiable risk factors like HbA1c, blood sugar levels, lipid profile etc were at a higher range among diabetic as compared to non-diabetic. Commonest non modifiable risk factor was elderly age, male etc.
Keywords: Acute Myocardial Infarction, Diabetic, Non Diabetic patients.

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INTRODUCTION

The number of people with diabetes rose from 108 million in 1980 to 422 million in 2014. Prevalence has been rising more rapidly in low- and middle-income countries than in high-income countries. Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation. Between 2000 and 2016, there was a 5% increase in premature mortality from diabetes. In 2019, diabetes was the ninth leading cause of death with an estimated 1.5 million deaths directly caused by diabetes. A healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are ways to prevent or delay the onset of type 2 diabetes [1-4].

Diabetes can be treated and its consequences avoided or delayed with diet, physical activity, medication and regular screening and treatment for complications. The reported prevalence of hyperglycaemia among those with acute coronary syndrome (ACS) varies widely. An early series reported 20% of patients with acute myocardial infarction (AMI) presenting with plasma glucose >11.0 mol/l.1Hyperglycaemia remains common even after excluding diabetic individuals [5].

Acute hyperglycemia on admission is common among patients with ST-elevation myocardial infarction (STEMI) and is one of the important predictors of in-hospital and long-term adverse events [6]. Whether long-term glucose dysregulation (assessed by HbA1c) is more important than acute hyperglycaemia is unknown [7].

In nondiabetic patients with ST-segment-elevation myocardial infarction, acute hyperglycemia is associated with adverse outcome. Whether this association is due merely to hyperglycemia as an acute stress response or whether longer-term glycometabolic derangements are also involved is uncertain [8].

Unlike acute hyperglycaemia, an elevated HbA1c level was not a risk factor for short-term outcomes in ST-segment elevation myocardial infarction patients without diabetes. Patients with acute hyperglycaemia and non-elevated HbA1c were associated with the worst prognosis. That suggests chronic glycaemic control/HbA1c level may help to recognize stress-induced hyperglycaemia and identify high-risk patients [9].

Present study summarizes the relationship between diabetes and MI, examine possible mechanism of disease progression, discuss current treatment recommendation and outline future research direction.

1) Cardiovascular problems are the major cause of mortality in India, causing >25% deaths in India. Coronary heart disease had reached epidemic proportion in India. 30% of acute coronary syndrome patients have diabetes mellitus.
2) DM is associated with endothelial dysfunction of vessels promoting atherosclerosis. The risk of CAD increased 2-4 folds by developing an acute cardiovascular event and of death after acute AMI.
3) Diabetic patients seek care late and they are less likely to receive thrombolytic therapy due to sympathectomy by autonomic neuropathy in diabetes and blocking the perception of afferent impulses.
4) In spite of early diagnosis of diabetes and better management of acute MI in ICCU, the overall morbidity and mortality remain higher in diabetes then non diabetics.

Present study was conducted with an aim to study clinical profile of acute MI in diabetic and non-diabetic patients.

AIM
- To study clinical profile of acute myocardial infarction in diabetic and non-diabetic patients.

MATERIAL AND METHODS

Present study type was a cross sectional observational type of study carried out at Medicine department of tertiary care hospital. A minimum of 81 patients were included in the study. Patients, both male and female who are having acute myocardial infarction with elevated blood sugar level but previously not diagnosed as diabetic.

Registration of patients was done from October 2019 to October 2021. Registration was done when patient got admitted under department of medicine. On registration the patients having exclusion criteria were not taken for the study.

Objective of the study was to study clinical profile of acute myocardial infarction in patients with diabetes and non-diabetes.

Patients diagnosed with acute myocardial infraction by ECG and cardiac enzyme (CPK-MB, Troponin I) were investigated by random blood sugar level. Patients with acute myocardial infarction were included in the study. These acute myocardial infarction patients underwent HBA1C. Cardiovascular events were further supported by clinical examination, biochemical test, and radiological investigation

INVESTIGATIONS
1. ECG
2. Enzymes
3. RANDOM BLOOD SUGAR LEVEL

RESULTS

Two groups were made. Group Diabetic and Non diabetic group. Each group had 80 cases each. Among diabetic patients, majority 56 patients were in age group >60 years, 21 in 46 to 60 years and 3 in 30 to 45 years and mean age was 67.13+12.57. Among nondiabetic patients, majority 52 patients were in age group >60 years, 27 in 46 to 60 years and 1 in 30 to 45 years and mean age was 67.37+11.98. No statistical significance was seen (p0.67).
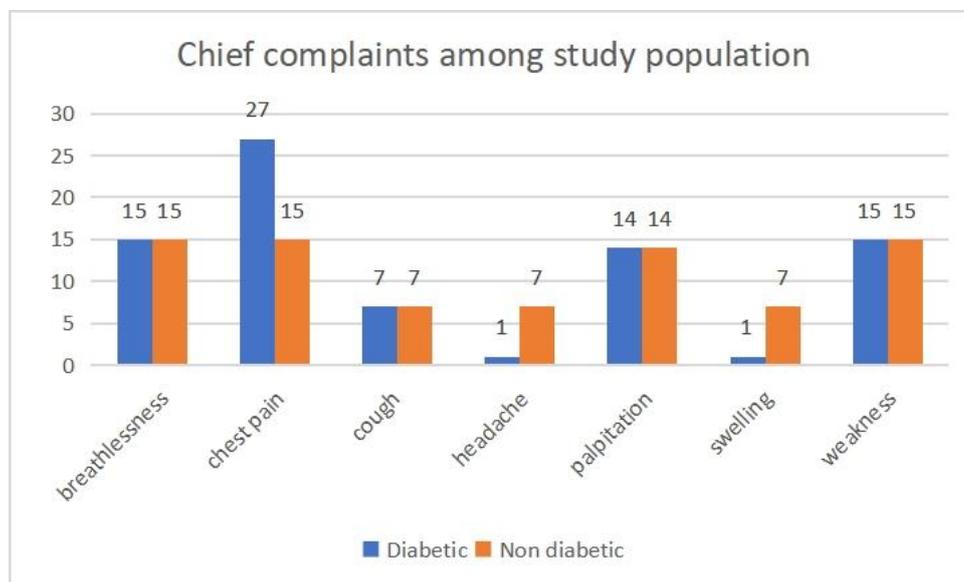

Fig-1: Chief complaints among study population

Among Diabetic patients, 15 had breathlessness, 27 had chest pain, 7 had cough, 1 had headache, 14 had palpitation, 1 had swelling and 15 had weakness. Among non-Diabetic 15 had breathlessness, 15 had chest pain, 7 had cough, 7 had headache, 14 had palpitation, 7 had swelling and 15 had weakness Statistical significance was seen (p-0.05).

Table-1: Distribution of study population depending on area affected

MI	Diabetic	Non diabetic
Antero Lateral	7	8
Anterior Septal	15	13
Anterior Wall	29	27
Inferior Wall	27	30
Postero Lateral	0	1
Posterior Wall	2	1
Total	80	80

Among Diabetic patients, 7 had Anterolateral, 15 had Antero septal, 29 had anterior wall, 27 had inferior wall and 2 had posterior wall myocardial infarction. Among non-Diabetic patients, 8 had Anterolateral, 13 had Antero septal, 27 had anterior wall, 30 had inferior wall and 1 each had posterior lateral and posterior wall myocardial infarction respectively. No statistical significance was seen (p0.87).

Table-2: Investigation

Parameter	Diabetic		Non Diabetic		P value
	Mean	SD	Mean	SD	
EF%	45.06	9.61	45.26	8.18	0.15
TGS	140.5	106.9	106.6	44.8	<0.00001*
HDL	43.9	12.72	45.93	10.06	0.03*
LDL	89.72	37.72	99.23	29.83	0.03*
Troponin	5.9	9.81	3.96	6.55	<0.0001*

Among diabetic cases mean EF% was 45.06+9.61, mean Triglycerides was140.5+ 106.9, mean HDL was 43.9+12.72, mean LDL was 89.72+37.72 and mean troponin was 5.9+9.81. Among Non-diabetic mean EF% was 45.26+8.81, mean Triglycerides was106.6+ 44.8, mean HDL was 45.93+10.06, mean LDL was 99.23+29.83, and mean troponin was 3.9+6.55. Except EF% all other parameters showed statistical significance.
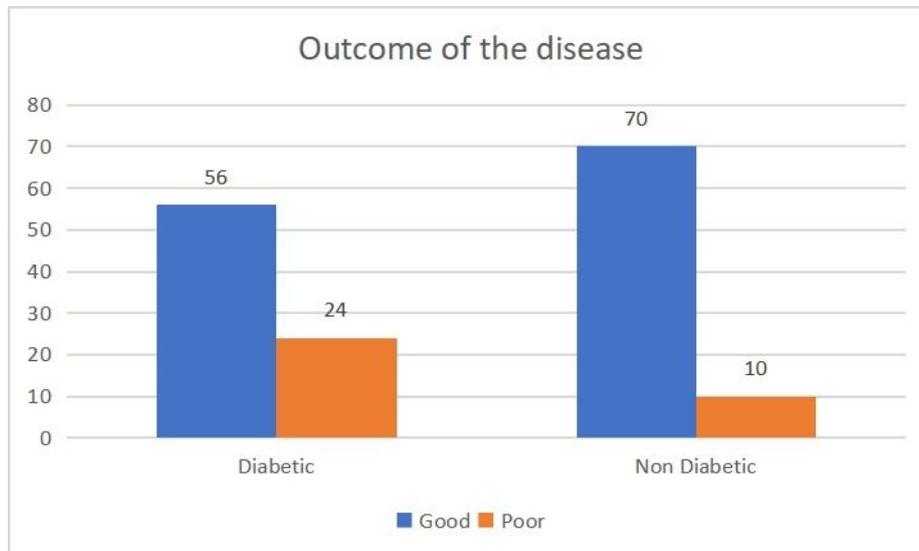

Fig-2: Outcome of the disease

Among diabetic cases 56 had good outcome and 24 had poor outcome and among non-diabetic cases 70 had good outcome and 10 had poor outcome. Statistical significance was seen (p-0.003).

DISCUSSION

Among diabetic patients, majority 56 patients were in age group >60 years, 21 in 46 to 60 years and 3 in 30 to 45 years and mean age was 67.13+12.57. Among nondiabetic patients, majority 52 patients were in age group >60 years, 27 in 46 to 60 years and 1 in 30 to 45 years and mean age was 67.37+11.98. No statistical significance was seen (p0.67) Study by Hao Y *et al*. [10] showed that at admission hyperglycaemia was found in 44 and 28% of the DM and non-DM patients. Study by Novakovic A *et al*. [11] showed that mean age of 62.8±13.8 years. Study by Iqbal MJ *et al*. [12] showed that at age 55-64 years, STEMI was observed in higher (P=0.001) percentage of diabetic than non-diabetic patients. Study by Sameh Samir *et al*. [13]. Showed that Mean age was 55.9 ± 7.12 years.

Among Diabetic patients, 7 had Anterolateral, 15 had Antero septal, 29 had anterior wall, 27 had inferior wall and 2 had posterior wall myocardial infarction. Among non-Diabetic patients, 8 had Anterolateral, 13 had Antero septal, 27 had anterior wall, 30 had inferior wall and 1 each had posterior lateral and posterior wall myocardial infarction respectively. No statistical significance was seen (p0.87). Study by Iqbal MJ *et al*. [12] showed that infarction of anterior site is more frequent. Anterior and inferior infarction was more common than inferior +

right ventricular and lateral infarction in both diabetic and non-diabetic patients. In this study, the most common adverse cardiac event observed was left ventricular failure. Several other studies have also made the similar observation. Cardiac failure had been very frequently associated with increased admission plasma sugar value in MI patients [14].

Similar laboratory investigations were seen among Study by Iqbal MJ *et al*. [12] showed that Dyslipidaemia was the stronger risk factor among diabetics, while it ranked number three in non-diabetic patients and Trop-T level was low in 46% and high in 54% of diabetic patients, while it was negative in 10%, detectable in 3%, low in 39% and high in 48% of non-diabetic patients Trop-T (1.85±0.28; 1.77±0.21).

Among diabetic cases 56 had good outcome and 24 had poor outcome and among non-diabetic cases 70 had good outcome and 10 had poor outcome. Prognostic RBSL value was 601mg/dL. Statistical significance was seen (p-0.003). Ullah M *et al*. [5] conducted a study and found that frequency of individual complications had no significant relation with the blood sugar level.

Study by Timmer JR *et al*. [8] showed that both elevated HbA1c levels (P<0.001) and elevated admission glucose (P<0.001) were associated with 1-year and long-term mortality and among nondiabetic patients with ST-segment-elevation myocardial infarction, both elevated admission glucose and HbA1c levels were associated with adverse outcome. Liu Y *et al*. [9] conducted a study and found that there were no

significant differences in 7- and 30-day mortality, and major adverse cardiovascular event rates.

CONCLUSION

Our study was a prospective study conducted to study clinical profile of Acute Myocardial Infarction in Diabetic and Non Diabetic patients. Commonest age group affected was above 60 years and predominantly males. Common clinical feature presented was chest pain, breathlessness, weakness and palpitations. It was seen that modifiable risk factors like HbA1c, blood sugar levels, lipid profile etc were at a higher range among diabetic as compared to non-diabetic. Commonest non modifiable risk factor was elderly age, male etc. The incidence of AMI was more among diabetic group as compared to non-diabetic group. Poor outcome was also more among diabetic group. It remains clear and undisputed that there is association between hyperglycaemia and increased mortality following acute myocardial infarction. Therefore, early diagnosis and treatment of the underlying cause is also very important. Early treatment of Diabetes and maintaining the blood sugar levels further prevents the cardiac diseases.

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