

An Observational Study to Investigate the Association of Homocystine Level and Lipid Profiles with Ischemic Heart DiseasePramod¹, Aishwerya², Girish Narayan Mishra³¹Assistant Professor, Department of Cardiology, Narayan Medical College and Hospital, Sasaram, Rohtas, Bihar, India²Consultant, Radiologist, Bihar Diagnostics and Imaging, Patna, Bihar, India³Associate professor and HOD, Department of Cardiology, Narayan Medical College and Hospital, Sasaram, Rohtas, Bihar, India

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Abstract:**Aim:** The aim of the present study was to evaluate the mortality in ST-segment elevation acute myocardial infarction in diabetic patients.**Methods:** The present study consisted of 100 patients of acute ST-segment elevation myocardial infarction (STEMI) of both genders at Department of cardiology. All were enrolled with their written consent.**Results:** The age group <40 years had 4 patients in group I and 5 in group II, 40-50 years had 9 in group I and 8 in group II, 50-60 years had 14 in group I and 15 in group II and >60 years had 23 in group I and 22 in group II. The difference was significant (P< 0.05). The site was anterior in 12 in group I and 10 in group II, inferior in 28 in group I and 23 in group II, inferior+ right ventricular in 7 in group I and 10 in group II and lateral in 3 in group I and 7 in group II. The difference was significant (P< 0.05). 7 patients in group I and 2 in group II had mortality in which streptokinase was given and 15 in group I and 6 in group II had mortality in which streptokinase was not given. The difference was significant (P< 0.05). The type of treatment given was streptokinase was 92, aspirin in 100, beta- blockers in 75, ACE inhibitors in 85, statins in 94 and diuretics in 60 patients. The difference was significant (P< 0.05).**Conclusion:** Diabetic patients who were not on streptokinase had higher mortality as compared to non- diabetics.**Keywords:** Acute coronary syndrome, Diabetes, STEMI.

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Introduction

The most frequent cause of mortality and morbidity is cardiovascular disease (CVD),[1] and the greatest burden of diseases worldwide belongs to ischemic heart disease.[2] Coronary artery disease (CAD) is a common condition that affects several million adults. Despite a reduction in the CVD rate in developed countries, ischemic heart disease is still high in developing countries. Acute myocardial infarction (MI) encompasses ST-segment elevation myocardial infarction (STEMI) and non-ST-segment elevation myocardial infarction (NSTEMI). Although in-hospital mortality is higher in SETMI than NSTEMI, the chance of 30 days and 1-year mortality is higher in NSTEMI compared to STEMI.[3] The global prevalence of diabetes mellitus (DM) in 2019 is estimated to be 9.3%, rising to 10.2% by 2030 and 10.9% (700 million) by 2045.[4] DM is an established risk factor for CAD.[5] Moreover, diabetic patients with MI have adverse cardiovascular effects and higher in-hospital morbidity and mortality rates.[6]

Previous studies have focused on mortality in patients with NSTEMI and indicated that DM is one of the major risk factors.[7] Nonetheless, the additive effects of risk factors in diabetic patients with MI have yet to be fully elucidated, and so do the factors influencing the mortality of MI in diabetic patients. In patients with AMI, heart failure is characterized by diastolic dysfunction alone or systolic and diastolic dysfunctions together. About 3% of the adult patients develop systolic dysfunction which recognized by echocardiography and is asymptomatic in about of them.[8]

Re-infarction is diagnosed by persistent and typical severe chest pain along with re-elevation of ST-segment and increased concentrations of cardiac markers in the blood. AMI remains one of the leading cause of mortality, especially in elderly patients where mortality can be 9 times higher than patients of less than 65 years of age.[9] The symptoms of AMI are late in diabetics, thus causes delay in fibrinolytic therapy and PTCA.[10] It has

been reported that diabetic patients with AMI should be administered thrombolytic agents very early. Such a practice can reduce mortality in them.[11,12] Early therapy with Statin has been found to reduce the recurrent ischemia.[13]

The aim of the present study was to evaluate the mortality in ST-segment elevation acute myocardial infarction in diabetic patients.

Materials and Methods

The present study consisted of 100 patients of acute ST-segment elevation myocardial infarction (STEMI) of both genders at Department of Cardiology, Narayan Medical College and Hospital, Sasaram, Rohtas, Bihar, India for 12 Months. All were enrolled with their written consent.

Demographic data such as name, age, gender etc. was recorded. Based on their glycated hemoglobin level, they were classified into diabetic (group I) and non-diabetic (group II). A 12-lead ECG of each patient was recorded. The patients were divided into four groups on the basis of ST-segment elevation in different leads. ST-segment elevation in leads V1-V6 (anterior AMI), in II, III, aVF (Inferior AMI), in II, III, aVF+ V4R (Inferior + Right ventricular AMI) and in I, aVL, V5, V6 (Lateral AMI). 5 ml blood sample were collected and analysed for serum CK and CK-MB and Trop-T level. Treatment was given to all patients. Results were assessed statistically using Mann Whitney U test. P value less than 0.05 was considered significant.

Results

Table 1: Distribution of patients

| Age group (Years) | Group I | Group II | P value |
|-------------------|---------|----------|---------|
| <40 | 4 | 5 | 0.01 |
| 40-50 | 9 | 8 | |
| 50-60 | 14 | 15 | |
| >60 | 23 | 22 | |

The age group <40 years had 4 patients in group I and 5 in group II, 40-50 years had 9 in group I and 8 in group II, 50-60 years had 14 in group I and 15 in group II and >60 years had 23 in group I and 22 in group II. The difference was significant (P< 0.05).

Table 2: Distribution of patients according to site

| Parameters | Variables | Group I | Group II | P value |
|------------|-----------------------------|---------|----------|---------|
| Site | Anterior | 12 | 10 | 0.05 |
| | Inferior | 28 | 23 | |
| | Inferior+ right ventricular | 7 | 10 | |
| | Lateral | 3 | 7 | |

The site was anterior in 12 in group I and 10 in group II, inferior in 28 in group I and 23 in group II, inferior+ right ventricular in 7 in group I and 10 in group II and lateral in 3 in group I and 7 in group II. The difference was significant (P< 0.05).

Table 3: Mortality based on Streptokinase

| Mortality | Group I | Group II | P value |
|-------------------------|---------|----------|---------|
| Streptokinase given | 7 | 2 | 0.05 |
| Streptokinase not given | 15 | 6 | |

7 patients in group I and 2 in group II had mortality in which streptokinase was given and 15 in group I and 6 in group II had mortality in which streptokinase was not given. The difference was significant (P< 0.05).

Table 4: Type of treatment given

| Treatment given | Number | P value |
|-----------------|--------|---------|
| Streptokinase | 92 | 0.07 |
| Aspirin | 100 | |
| Beta- blockers | 75 | |
| ACE inhibitors | 85 | |
| Statins | 94 | |
| Diuretics | 60 | |

The type of treatment given was streptokinase was 92, aspirin in 100, beta- blockers in 75, ACE inhibitors in 85, statins in 94 and diuretics in 60 patients. The difference was significant (P< 0.05).

Discussion

Acute coronary syndrome (ACS) remains a leading cause of morbidity and mortality. The Global Registry of Acute Coronary Events (GRACE) study showed that the mortality rate of ACS patients after 1 year is approximately 15%, and the cumulative

mortality rate after 5 years is as high as 20%. Consequently, early risk stratification is important to prevent and manage ACS.[14] Insulin resistance (IR), the decreased insulin sensitivity of peripheral tissues characterized by defects in the uptake and oxidation of glucose, plays a critical role in the

pathogenesis of diabetes as well as cardiovascular disease (CVD). The molecular mechanisms include the roles of IR in vascular function, macrophage accumulation, atherosclerosis development and hypertension.[15] Diabetes mellitus is a major risk factor for cardiovascular disease in general and for coronary heart disease in particular. Furthermore, the recent National Cholesterol Education Program III guidelines have elevated diabetes to a coronary disease risk equivalent.[16]

Diabetes is a universal problem and is becoming a major concern at old age especially in obese people and in people with sedentary life style. The risk of AMI is 2-4 times higher in diabetics. The coronary artery disease is much more serious in diabetics with about 4 times higher morbidity/mortality in men, while 8 times in women.[17-19] The age group <40 years had 4 patients in group I and 5 in group II, 40-50 years had 9 in group I and 8 in group II, 50-60 years had 14 in group I and 15 in group II and >60 years had 23 in group I and 22 in group II. The difference was significant ($P < 0.05$). Franklin et al[20] examined patients with ST-segment elevation acute myocardial infarction, non-ST-segment elevation acute myocardial infarction, and unstable angina. The study sample consisted of 5403 patients with ST-segment elevation acute myocardial infarction, 4725 with non-ST segment elevation acute myocardial infarction, and 5988 with unstable angina. Approximately 1 in 4 patients presented to participating hospitals with a history of diabetes. Patients with diabetes were older, more often women, with a greater prevalence of comorbidities, and they were less likely to be treated with effective cardiac therapies than nondiabetic patients.

The site was anterior in 12 in group I and 10 in group II, inferior in 28 in group I and 23 in group II, inferior+ right ventricular in 7 in group I and 10 in group II and lateral in 3 in group I and 7 in group II. The difference was significant ($P < 0.05$). Luo et al²¹ included 1092 STEMI patients who underwent PCI. The patients were divided into 4 quartiles according to TyG index levels. Clinical characteristics, fasting plasma glucose (FPG), triglycerides (TGs), other biochemical parameters, and the incidence of major adverse cardiovascular and cerebral events (MACCEs) during the follow-up period were recorded.

Wang et al[22] conducted an exhaustive metaanalysis evaluating the possible role of gender in the mortality rate in the short and long term after NSTEMI. They observed no significant differences between men and women in the prognosis of NSTEMI. Further research is recommended on the impact of sex on mortality in diabetic patients with NSTEMI. 7 patients in group I and 2 in group II had mortality in which streptokinase was given and 15 in group I and 6 in group II had mortality in which

streptokinase was not given. The difference was significant ($P < 0.05$). The type of treatment given was streptokinase was 92, aspirin in 100, beta-blockers in 75, ACE inhibitors in 85, statins in 94 and diuretics in 60 patients. The difference was significant ($P < 0.05$). Lee et al²³ showed that a higher TyG index is associated with an increased risk of coronary artery stenosis in asymptomatic subjects with type 2 diabetes, particularly when they have risk factors for cardiovascular disease. The findings of Jin et al²⁴ showed that the TyG index was positively associated with future cardiovascular events, suggesting that the TyG index may be a useful marker for predicting clinical outcomes in patients with CAD and that the TyG index might have better prognostic value than haemoglobin glycation indexes (HGs) in diabetes patients with new-onset, stable CAD.

Conclusion

Diabetic patients who were not on streptokinase had higher mortality as compared to non-diabetics.

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