Prevalence of Diabetes Mellitus in Myocardial Infarction Patients: An Observational Study

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Conflict of interest: Nil

Abstract

Background: According to reports, diabetes is a standalone risk factor for the development of cardiovascular disease. According to data from the World Health Organisation (WHO), cardiovascular disease is having a greater global impact on mortality and morbidity.

Material & Methods: Our tertiary care hospital served as the site of the current observational study, which lasted six months, from June to November 2018. After receiving written informed consent, we enrolled 100 AMI patients.

Results: 60% of the study participants had normal blood sugar levels, 25% had diabetes mellitus that they were already aware of, 11% had the condition discovered for the first time while in the hospital, and 4% had elevated blood sugar levels brought on by stress.

Conclusion: Increased blood sugar was linked to acute cardiovascular conditions, particularly in individuals with acute myocardial infarction, and was also a predictor of prognosis and recurrences.

Keywords: Diabetes Mellitus Prevalence, Acute Myocardial Infarction and Risk Variables.

Introduction

One of the primary causes of mortality and morbidity worldwide is acute myocardial infarction (AMI). The World Health Organisation (WHO) describes cardiovascular disease as a non-communicable disease that is on the rise nowadays. According to clinical and ECG criteria, the prevalence of ischemic heart disease (IHD) in the adult population in India was estimated to be 27 per 1000 in rural regions and 97 per 1000 in urban areas [1]. Diabetes is a non-communicable illness that is also quite common worldwide and manifests as an epidemic on a global scale. According to reports, diabetes is a standalone risk factor for the development of cardiovascular disease. According to World Health Organisation (WHO) data, there has been a rise in mortality and morbidity due to cardiovascular disease worldwide [2].

The Framingham research, a well-known cohort study, found that the burden of cardiovascular illnesses among people with diabetes was three times higher in women than in non-diabetics and two times higher in men than in non-diabetics. Ischemic heart disease causes several major health-related as well as social difficulties across all afflicted age groups, according to epidemiological characteristics, early impairment, and the percentage of morbidity and mortality [3]. Since the last 7 to 8 decades, diabetes and cardiovascular disease have been linked. According to reports, people with diabetes have a 2-4

times higher chance of developing coronary illnesses than non-diabetics, and the same held true for acute myocardial infarctions. However, due to early detection and care, there was a documented decline in the prevalence of acute myocardial infractions [4]. It was shown that 20% of AMI patients in hospitals who had no prior history of diabetes experienced elevated blood glucose levels while they were there. As a result, hospitalised patients with AMI had higher fatality rates [5]. According to reports, the cause of this association is stress brought on by medical conditions, and it could also be an undiagnosed diabetic underlying issue. In order to understand the prevalence of diabetes mellitus among patients with acute myocardial infarctions, the current investigation was carried out.

Materials & Methods

Our tertiary care hospital served as the site of the current observational study, which lasted six months, from June to November 2018. Epi Info software version 7.2 calculated a sample size of 100 with a 95% confidence interval and a 10% allowable margin of error. Before the study began, approval from the institutional ethics committee was obtained. All study participants provided their written informed permission. For each patient, a thorough history was gathered that included information on their demographics, blood pressure, history of smoking and drinking, and past clinical and medical experiences. Patients with epilepsy, subarachnoid haemorrhage, subdural hematomas, or any other neurological disorder or impairment that would have an impact on the patients' HbA1c values were excluded from the study. Blood was drawn from the patients to measure HbA1c and random blood glucose levels. Additionally, estimates of fasting blood glucose levels for the second and fifth days were made. SPSS v22 was used for the data analysis. All analyses were conducted at a 5% alpha level of significance, which denotes the presence of a significant association if the p-value was less than 0.05.

Results

A total of 100 patients with acute myocardial infarction were enrolled in the current study. Only 36% of the patients were female, with 64% of the patients being men. The patients were roughly 66.2–7.4 years old on average. 35% of patients had a BMI over 25, while the remaining patients had a BMI under 25.28% of patients were alcoholics, and 34% of patients smoked. Out of all study participants, 60% had normal blood sugar levels, 25% had diabetes mellitus that they were already aware of, 11% had their diabetes discovered for the first time while in the hospital, and 4% had elevated blood sugar levels brought on by stress. (Table 1)

Table 1: Distribution of study participants according to demographic details.

Parameters		No. of patients (%)
Gender	Male	64
	Female	36
BMI	<25	65
	≥25	35
Smoking Habit	Smokers	34
	Non-Smokers	66
Alcohol Habit	Alcoholic	28
	Non-Alcoholic	72
Glycemic Status	Euglycemic	60
	New Diabetics	11
	Known Diabetics	25
	Stress hyperglycemia	4

Most of the subjects in the current study who were hospitalised for an AMI and diabetes mellitus had high cholesterol and triglyceride levels. The total cholesterol was 221.410.2 mg/dl, while the TGL levels were revealed to be 199.78.6 mg/dl. According to the results of the current study, diabetic patients who have already experienced an AMI attack are at a significant risk of experiencing another one in the future. (Table 2)

Table 2: Distribution of study participants according to biochemical parameters.

Parameters	Patients with diabetes	Patients without diabetes
Hb (g%)	13.4±1.2	12.2±0.6
Fasting plasma glucose (mg/dL)	130.1±8.4	95.8±3.5
Glycated hemoglobin	8.7±0.9	5.3±0.4
Total cholesterol (mg/dL)	221.4±10.2	154.9±8.7

Discussion

A total of 100 patients with acute myocardial infarction were enrolled in the current study. Only 36% of the patients were female, with 64% of the patients being men. The patients were roughly 66.2–7.4 years old on average. 35% of patients had a BMI over 25, while the remaining patients had a BMI under 25.28% of patients were alcoholics, and 34% of patients smoked.

Out of all study participants, 60% had normal blood sugar levels, 25% had diabetes mellitus that they were already aware of, 11% had their diabetes discovered for the first time while in the hospital, and 4% had elevated blood sugar levels brought on by stress. Compared to patients with normal blood glucose levels, diabetic patients who experienced an acute myocardial infarction were more likely to experience problems. Recurrent infarction, atrioventricular and intraventricular conduction anomalies, cardiogenic shock, myocardial rupture, and persistent congestive heart failure were the sequelae that were most commonly present [6].

Acute myocardial infarction participants in the current study had a 40% overall prevalence of diabetes. According to a study by Tenerz *et al.*, 25% of acute myocardial infarction patients had diabetes mellitus. This study had 305 individuals. Follow-up was required since elevated random blood glucose levels at admission were not a reliable indicator of diabetes. HbAlc was discovered to be a non-significant indicator in the diabetes diagnosis [7]. Among elderly patients with acute myocardial infarction, a study by Kosiborod M *et al.* found that elevated blood glucose levels were common and found to be associated with a high mortality risk, especially in those patients who had previously unknown diabetes status [8].

Most of the subjects in the current study who were hospitalised for an AMI and diabetes mellitus had high cholesterol and triglyceride levels. The total cholesterol was 221.410.2 mg/dl, while the TGL levels were revealed to be 199.78.6 mg/dl. According to the results of the current study, diabetic patients who have already experienced an AMI attack are at a significant risk of experiencing another one in the future. According to a study by Thom T. *et al.* on patients with acute myocardial infarction, cardiovascular disorders are the biggest cause of death in affluent nations like the USA, especially if they include comorbid conditions like diabetes. As a result, patients' life expectancies actually decreased [9]. According to a study by Capes S. *et al.* on patients with acute myocardial infarction, hyperglycemia brought on by stress hospitalisation is linked to a high risk of in-hospital mortality in both patients with and without diabetes, as well as an increased risk of cardiovascular morbidity and cardiogenic shock [10] .

Several individuals with acute myocardial infarction were found to have normal glucose metabolism, which elevated blood

glucose levels in such patients, according to another study by Bartnik M *et al*. After two hours of consuming glucose, an oral glucose tolerance test was performed to estimate blood glucose levels, which clearly showed the glucometabolic condition. The management of the disease and the prognosis were influenced by this evaluation of the glucometabolic state levels in acute myocardial infarction patients [11].

Conclusion

According to the results of the current study, elevated blood sugar levels were linked to acute cardiovascular illnesses, particularly in individuals who had just experienced an acute myocardial infarction, and they also served as a predictor of prognosis and recurrence. Better outcomes and a higher quality of life will result from patients with a history of acute myocardial infarction having their blood sugar levels adequately controlled.

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