ESTIMATION OF BURDEN OF DIABETES MELLITUS IN MYOCARDIAL INFARCTION PATIENTS AT TERTIARY CARE CENTER

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ABSTRACT

Background: Diabetes has been reported as an independent risk factor for the occurrence of cardiovascular disease. Data from the World Health Organization (WHO) reported that there is an increase in mortality and morbidity due to cardiovascular disease worldwide. **Material & Methods:** The present observational study was conducted at of our tertiary care hospital, with study duration of six months from June 2018 to November 2018. We enrolled 100 patients with AMI after written informed consent. **Results:** Out of the total study participants 60% had normal blood glucose levels, 25% had previously known diabetes mellitus, 11% of them were identified first time as having diabetes during the hospitalization while 4% had increased blood sugar levels due to stress. **Conclusion:** the increased blood sugar levels were associated with acute cardiovascular diseases, especially in references to the patients with acute myocardial infarction and also a predictor of outcome and reoccurrences

Keywords: Acute myocardial infarction, Diabetes mellitus, Prevalence, Risk factors

INTRODUCTION

Acute myocardial infarction (AMI) is among the leading causes of mortality and morbidity across the globe. According to the World Health Organization (WHO), cardiovascular disease as a non-communicable disease is a modern epidemic. In the Indian context, the burden of ischemic heart disease (IHD), based on clinical and ECG criteria in the adult population was estimated approximately 97 per 1000 population in urban areas and 27 per 1000 population in rural areas **(1)**. Diabetes is an also non-communicable disease which is highly prevalent all around the world and presents globally as a diabetes epidemic. Diabetes has been reported as an independent risk factor for the occurrence of

cardiovascular disease. Data from the World Health Organization (WHO) reported that there is an increase in mortality and morbidity due to cardiovascular disease worldwide **(2)**.

A well-known cohort study, Framingham study concluded that the burden of cardiovascular diseases among people with diabetes was twofold more among males than that in non-diabetic males, and was three-fold more among females than that in non-diabetic females. On the basis of epidemiological characteristics, early disability, the percentage of morbidity and mortality, ischemic heart disease constitutes numerous serious health-related as well as social problems among all affected age groups **(3)**.

The association of diabetes and cardiovascular disease has been known for past 7-8 decades. It was reported that the risk of coronary diseases among people with diabetes was 2-4 times higher than in non-diabetics and results were similar for acute myocardial infarctions. However, there were a decrease in the prevalence of acute myocardial infractions was reported due to early detection and intervention **(4)**. It was observed that approximately 20% of hospitalized patients with AMI and who had no previous history of diabetes shows increased blood glucose levels during their hospitalization. This leads to increases in the mortality rates in hospitalized patients with AMI **(5)**. The reason for this association is reported to be the stress due to diseases condition and may be the underlying unknown diabetic status. Hence, the present study was conducted to know the burden of diabetes mellitus among patients with acute myocardial infarctions.

MATERIALS & METHODS

The present observational study was conducted at of our tertiary care hospital, with study duration of six months from June 2018 to November 2018. A sample size of 100 was calculated at 95% confidence interval at 10% acceptable margin of error by epi info software version 7.2. Clearance from Institutional Ethics Committee was taken before the start of the study. Written informed consent was taken from all the study participants. A detailed history was taken related to demographic data, blood pressure, smoking and alcohol history, previous clinical and medical history was recorded for all the patients. Patients who had a subdural hematoma and subarachnoid hemorrhage, epilepsy and any other neurological condition or disability that would affect the HbA1c levels of the patients were excluded from the study. Blood was collected from the patients for random blood glucose levels and HbA1c levels and further on the 2nd day and the 5th days of fasting blood glucose levels were estimated. Data analysis was carried out using SPSS v22. All tests were done at alpha (level significance) of 5%; means a significant association present if the p-value was less than 0.05.

RESULTS

In the present study, A total of 100 patients of acute myocardial infarction were enrolled for the study. Most of the patients were males 64%, and only 36% of them were females. The average age of the patients was around 66.2±7.4 years. 35% of patients had BMI ≥25, and the rest were had BMI < 25. 34% of patients were smokers, and 28% of patients were alcoholic. Out of the total study participants, 60% had normal blood glucose levels, 25% had previously known diabetes mellitus, 11% of them were identified first time as having diabetes during the hospitalization while 4% had increased blood sugar levels due to 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

In the present study, most of the study participants who were admitted to the hospital with AMI and diabetes mellitus had elevated cholesterol and triglyceride levels. The TGL levels were found 199.7±8.6 mg/dl while the total cholesterol was 221.4±10.2 mg/dl. Diabetic patients who have had an

attack of AMI previously were at high risk for recurrent AMI in the future, it has been reported in the present study. (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

In the present study, A total of 100 patients of acute myocardial infarction were enrolled for the study. Most of the patients were males 64%, and only 36% of them were females. The average age of the patients was around 66.2±7.4 years. 35% of patients had BMI ≥25, and the rest were had BMI < 25. 34% of patients were smokers, and 28% of patients were alcoholic. Out of the total study participants, 60% had normal blood glucose levels, 25% had previously known diabetes mellitus, and 11% of them were identified first time as having diabetes during the hospitalization while 4% had increased blood sugar levels due to stress. Diabetic patients who had acute myocardial infarction were more likely to had complications compared to patients who had normal blood glucose levels. The complications most likely present were recurrent infarction, atrioventricular and intraventricular conduction abnormalities, cardiogenic shock, myocardial rupture and chronic congestive heart failure [6].

In the present study, the overall prevalence of diabetes among the study participants with acute myocardial infarction was 40%. A study conducted by Tenerz et al among 305 patients of acute myocardial infarction and reported that 25% of patients with acute myocardial infarction had diabetes mellitus. An increased random blood glucose level at admission was not a valid measure to establish diabetes; hence follow-up was necessary. HbA1c was found to be non-significant measure in the diagnosis of diabetes [7]. A study conducted by Kosiborod M et al. among elderly patients of acute myocardial infarction and reported that elevated blood glucose levels were common and found to be associated with high mortality risk in elderly patients with acute myocardial infarction, particularly those who had the previously unknown status of diabetes [8].

In the present study, most of the study participants who were admitted to the hospital with AMI and diabetes mellitus had elevated cholesterol and triglyceride levels. The TGL levels were found 199.7±8.6 mg/dl while the total cholesterol was 221.4±10.2 mg/dl. Diabetic patients who have had an attack of AMI previously were at high risk for recurrent AMI in the future, it has been reported in the present study. A study conducted by Thom T et al. among patients of acute myocardial infarction and reported that the leading cause of mortality in developed countries such as the USA is cardiovascular diseases, mainly if it was associated with a comorbid condition like diabetes. This causes the effective decrease in the life expectancy of patients [9].

A study conducted by Capes S et al among patients of acute myocardial infarction and reported that hyperglycemia due to stress hospitalization with acute myocardial infarction is associated with a high risk of in-hospital mortality among patients with and without diabetes; the risk of cardiovascular morbidity and cardiogenic shock is also increased in patients with or without diabetes [10]. Another study conducted by Bartnik M et al. among patients of acute myocardial infarction and reported that normal glucose metabolism was found in a few patients that increased blood glucose levels in patients with acute myocardial infarction. Oral glucose tolerance test was done for blood glucose estimation after two hours of glucose intake which easily demonstrates the glucometabolic state. This estimation of levels of glucometabolic state in patients of acute myocardial infarction influenced disease management and also predicts the outcome[11].

CONCLUSION

We concluded from the present study that the increased blood sugar levels were associated with acute cardiovascular diseases, especially in references to the patients with acute myocardial infarction and also a predictor of outcome and reoccurrences. The adequate control of blood sugar levels among patients who had a history of acute myocardial infarction will lead to better outcomes and a better quality of life.

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