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Original Research Article.

The Incidence of Myocardial Infarction in Diabetes Mellitus

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ABSTRACT

Introduction: Diabetics responsible for a greater mortality rate during the acute phase of myocardial infarction (MI).

Objective: In this study our main aim is to evaluate the incidence of myocardial infraction in diabetes mellitus.

Methodology: This study was done at different private hospital in Khulna District. During the period of two years (2015-2017) among 105 patients. Where complete demographic details such as age, gender, blood pressure, smoking and alcohol details, previous clinical and medical history were noted for all the patients. Blood was collected from the patients for random blood glucose levels and HbA1c levels.

Results: In the study patients male patients 26.8% higher than female and 28.1% were known diabetics. 10.7% of them were identified as diabetic during the hospitalization. Also where diabetic patients who have had an MI previously are more at risk to a recurrent MI rather than those without.

Conclusion: From result we can conclude that the chronic and acute hyperglycemia linked with acute myocardial infarction is an independent and determinant factor in the outcome for patients with and without diabetes mellitus. Further study is needed for better outcome.

Keywords: Myocardial Infarction (MI), Diabetics, Hyperglycemia.

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INTRODUCTION

Myocardial infarction (MI), usually known as a heart attack, occurs when blood flow decreases to a part of the heart, causing damage to the heart muscle. The most communal symptom is chest pain which may travel into the shoulder, arm, back, neck, or jaw. Often it happens in the center or left side of the chest and lasts for more than a few minutes. The discomfort may occasionally feel like heartburn. Other symptoms may include shortness of breath, nausea, feeling faint, a cold sweat, or feeling tired.[1] About 30% of people have atypical symptoms.[2] Women more frequently present without chest pain and instead have neck pain, arm pain, or feel tired.[3] An MI may reason of heart failure, an irregular heartbeat, cardiogenic shock, or cardiac arrest. It is the most common form of coronary heart disease in the world and cause of premature death. The incidence of myocardial infarction is also increasing in Bangladesh.[4] Rates of cardiovascular disease have risen significantly in low-income and middle-income countries, with about 80% of the burden now occurring in these countries.[5,6] Operative inhibition needs a global strategy based on knowledge of the importance of risk factors for cardiovascular disease in different geographic regions. In most of the cases, diabetes mellitus is a very common risk factor for myocardial infarction (MI).Diabetes has become a national health alarm in Bangladesh. The BDHS 2011 displayed the overall, age standardized prevalence of diabetes and pre-diabetes to be 9.7% and 22.4%, respectively; among urban residents, the age-adjusted prevalence of diabetes was 15.2% compared with 8.3% in rural residents.[7,8] According to the International Diabetes Federation statement in 2010, the explosion in diabetes prevalence will place Bangladesh among the top 7 countries in terms of the number of people living with diabetes in 2030.[9]

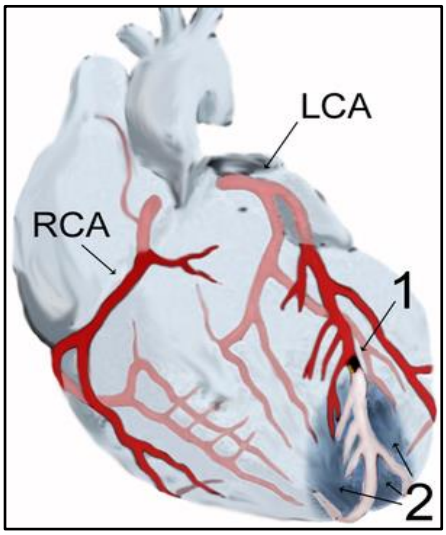

Figure 1: Myocardial infraction[10]

In US diabetes affects more than 6% of the people and is present in more than 30% of the patients hospitalized with acute coronary syndromes. This increased risk is almost two to four fold for coronary heart disease (CHD) in patients with diabetes.[4,6] They also have a two-fold risk for short-term mortality rate after myocardial infarction (AMI). In this study our main goal is to evaluate the incidence of myocardial infarction in diabetes mellitus.

OBJECTIVE

General Objective

- To assess the incidence of myocardial infraction in diabetes mellitus.

Specific Objective

- To identify classification of patients according to glycaemic status.
- To detect relationship between diabetes and previous MI among the patients.

METHODOLOGY

Study Type

This was a cross sectional study.

Study Period and Place

This study was conducted by the department of medicine at tertiary care hospital during the period of two years 2015-2017 among 105 patients.

Method

Consent was taken from all the patients before the inclusion into the study. All patients had fulfilled the diagnostic criteria for acute myocardial infarction. Detailed demographic details such as age, gender, blood pressure, smoking and alcohol details, previous clinical and medical history were noted for all the patients. Blood was collected from the patients for random blood glucose levels and HbA1c levels. Cholesterol levels and triglyceride levels were also estimated. Patients were considered diabetic if they were known diabetic or their glucose levels were, RBS >200 mg/dL, fasting glucose >126 mg/dL and post prandial glucose >200 mg/dL. If even on the 5th day if the glucose levels were <126 mg/dl, they were considered to be non-diabetic. Newly diagnosed diabetics were defined as such if they have elevated glucose level during their entire hospital stay. They were further confirmed after 2-3 months of re-measuring the glucose levels, when the patient came for follow-up. Patients who were not previously known diabetics and whose fasting blood glucose were <126 mg/dl were considered to be non-diabetic. Therefore, the final assessment of the patients based on blood glucose levels was done as:

- Euglycemic: patients with normal RBS, FBS and PPBS and HbA1c
- Known diabetic: Those who have a previous history of diabetes.
- Newly detected diabetes: Those with RBS ≥200 mg/dL, fasting glucose ≥126 mg/dL, post prandial glucose ≥200 mg/dL and HbA1c >6.5% but without a history of diabetes.
- Stress hyperglycemia: RBS ≥200 mg/dL with HbA1c <6.5%.

Data Collection and Analysis

Data will be collection in predesigned data collection sheet using various parameters. Interviews conducted using direct questionnaire and all information will be noted in pre from data collection sheet. Data were compiled and appropriate statistical package for social science (SPSS).

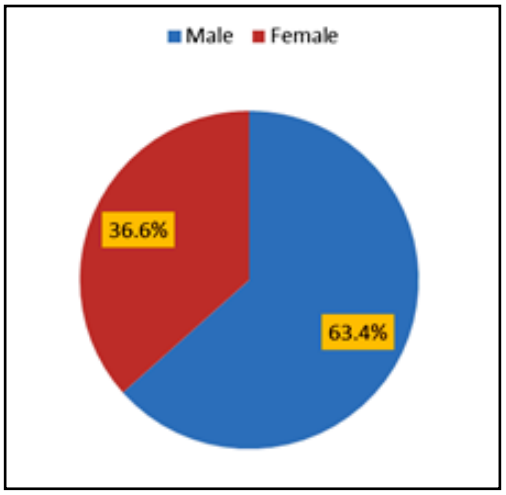

Figure 2: Gender distribution of the patients

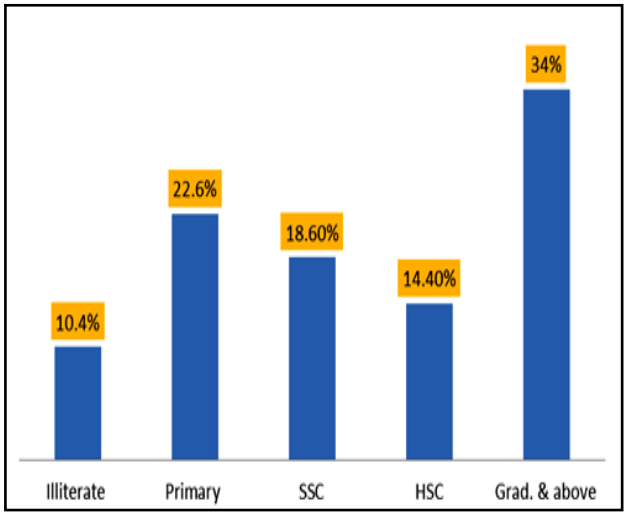

Figure 3: Educational status of the patients.

Table 1: Age distribution of the patients

Age in years	Male,%	Female,%
31-40	16%	15%
41-50	39%	28.79%
51-60	45%	56.21%

Table 2: Clinical characteristics in patients

Variable	Male,%	Female,%
Smoking:		
Always	30%	0%
Never	27.1%	97.5%
Occasionally	42.9%	2.5%
Alcoholic status		
Never	62.2%%	81.7%
Occasionally	24.4%	7.8%
Regular	13.4%	10.5%
Blood pressure		
Systolic	136±6	139±4
Diastolic	92±1	94±5

Table 3: Biochemical status of the patients

Biochemical status	Patients with diabetes	Patients without diabetes
Total cholesterol (mg/dL)	212.3±5.2	141.8±7.6
HDL- cholesterol (mg/dL)	44.6±2.2	41.6±4.6
LDL-cholesterol (mg/dL)	136.2±4.1	123.5±3.9
Triglycerides (mg/dL)	198.4±5.3	118±6.7
Fasting plasma glucose (mg/dL)	126±6.1	95.6±2.1
Hb (g%)	13.7±0.9	11.8±0.4
Glycated hemoglobin	8.02±1.4	4.8±0.1

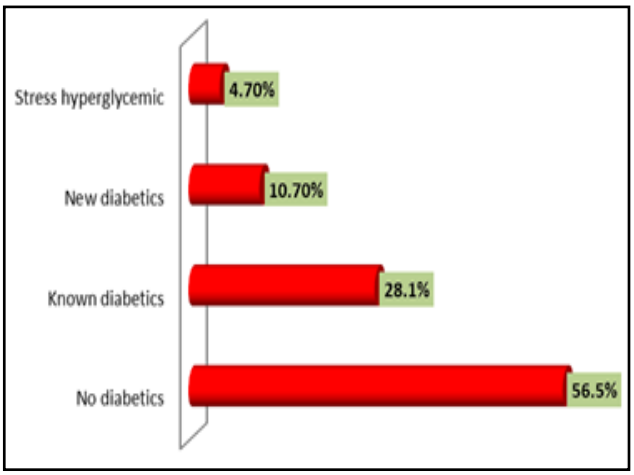

Figure-4: Classification of patients according to glycaemic status.

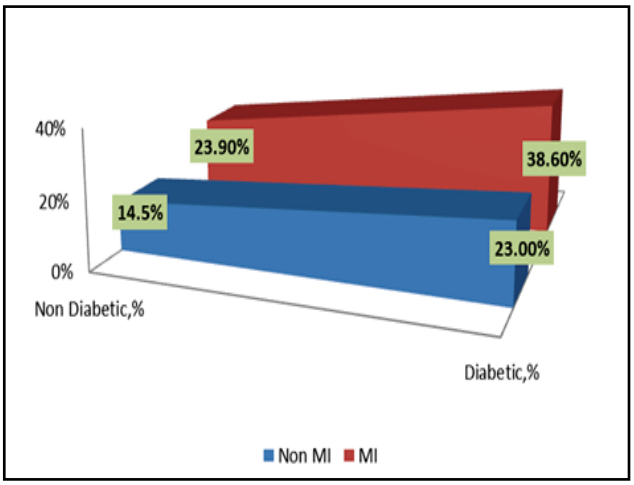

Figure-5: Relationship between diabetes and previous MI among the patients

RESULTS

In figure-2 shows gender distribution of the patients, where among 105 patient's male patients 26.8% higher than female.

In table-1 shows age distribution of the patients where in both male and female (51-60) year's group was higher than other age group.

In figure-3 shows educational status of the patients where 34% were graduate and only 10.4% were illiterate.

In table-2 shows clinical characteristics in patients where 30% male patients did smoking always whereas none of the female patients did smoking.

In table-3 shows biochemical status of the patients where most of the patients who were admitted to the hospital with MI were obese or overweight with elevated cholesterol and triglyceride levels. The TGL levels were nearly 200 mg/dl while the total cholesterol was 212.3 mg/dl.

In figure-4 shows classification of patients according to glycaemic status where out of the 105 patients, 56.5% had no diabetics, 28.1% were known diabetics. 10.7% of them were identified as diabetic during the hospitalization while 4.7% had elevated blood sugar levels due to stress.

In figure-5 shows relationship between diabetes and previous MI among the patients where diabetic patients who have had an MI previously are more at risk to a recurrent MI rather than those without. It has been detected in our study that the risks for diabetic patients without a prior MI are equally lying to an MI as that as the non-diabetics who have had a previous attack.

DISCUSSION

In our study, a majority of our patients were male and had 26.8% significantly greater chances of developing MI compared to females which is consistent with previous studies in Bangladesh by which the percentage of male patients were 85 – 92 %.[11]

In our study we also found that in both male and female (51-60) year's group was higher than other age group.

Tobacco use is somewhat common in Bangladesh. Bangladesh is one of the top 10 countries that make up two-thirds of the world population of smokers.[12] According to the Bangladesh NCD risk factor survey 2010, the incidence is 51.0% for any form of tobacco, 26.2% for smoking and 31.7% for smokeless tobacco (SLT). During the study we found that 30% male patients did smoking always whereas none of the female patients did smoking.

The diabetic patients who sustain myocardial infarction are more likely to get complications than those patients who have no diabetes such as recurrent infarction, cardiogenic shock, atrioventricular and intraverntricular conduction abnormalities, chronic congestive heart failure and myocardial rupture.[13-15]

In our study, the prevalence of diabetes among the patients with myocardial infarction was 38.6%. This was relatively high in relation to a few other studies but a few studies corroborated our study.[13,16] In one study reported that every fourth patient hospitalized with acute myocardial infarction had diabetes mellitus.[17]

The main cause of death in industrialized countries such as USA is coronary artery disease, especially if it is associated with diabetes. There is a considerable decrease in life expectance in such people.[18]

Elevation of blood glucose levels on admission during the early phase of MI in patients who have no history of diabetes is said to

be a predictor of in hospital and long term outcome in patients with AMI. This elevation is said to be mainly stress related.[19] In our study we have had 4.7% such cases.

The relationship between diabetes and non-fatal AMI may be a direct effect of diabetes. The metabolic effect of diabetes on cardiovascular morbidity and mortality is complex.[20,21] Collagen cross-linking is a main mechanism by which vascular and cardiac compliance is diminished in diabetes and may also contribute to diabetic cardiomyopathy.[22,23]

Other potential underlying mechanisms may include accelerated atherosclerosis associated with diabetes. Hyperglycaemia, insulin resistance, and advanced glycation end-products have been associated in vascular inflammation and endothelial dysfunction in patients with diabetes.[24]

Serum levels of insulin-like growth factor-binding protein-1 are elevated in patients with diabetes, which in turn has been shown to be related with increased risk for cardiovascular mortality and morbidity in these patients.[25] The prevalence of known diabetics in our study were 28.1% while one studies said it was 24%, also another reported that it was 8.5% and other study said that the incidence was 17%.[26-28]

The newly diagnosed diabetic is our study was 10.7% while in another study said that it was 18% and other study reported that it was 8.75%.[27,28]

LIMITATION

- Limited number of patients in a single hospital.
- The results might not be adequate to change clinical practice.

CONCLUSION

After much analysis we can conclude that, the chronic and acute hyperglycemia linked with acute myocardial infarction is an independent and determinant factor in the outcome for patients with and without diabetes mellitus.

The control of blood sugar levels in patients especially in patients who have had a history of MI will lead to better outcomes and better quality of life.

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