Hyperglycemia after Myocardial Infarction as an Indicator of Undiagnosed Diabetes Mellitus

1SHAFIQUE AHMED, 2SHEHZAD AHMAD, 3ANWAR UL HASSAN, *4MOHAMMAD KASHIF*

ABSTRACT

Objective: To determine the incidence of undiagnosed diabetes mellitus in patients of acute myocardial infarction who have elevated serum glucose levels at the time of presentation.
Study Design: Observational study
Place and duration of study: Department of Cardiology, Bahawal Victoria Hospital Bahawalpur from 1st May 2012 to 31st October 2012.
Methodology: Initially 531 patients presenting with acute myocardial infarction with an elevated serum glucose level at the time of admission were included in the study. Out of these, 493 patients were subjected to oral glucose tolerance test (OGTT) one month after the acute event. The patients were divided into three groups depending upon the results of OGTT; normal, impaired glucose tolerance or diabetes mellitus. The data was analyzaed using SPSS version 10.
Results: In our study, 62 % of the subjects with elevated serum glucose level at the time of admission had deranged glucose metabolism as diagnosed by subsequent OGTT. The criteria to be diagnosed as having diabetes mellitus were fulfilled by 137 patients. Age of the patients, BMI, and the prevalence of hypertension and family history of diabetes mellitus were higher in the study group having deranged glucose metabolism, as well as the patients falling in this category were mostly males.
Conclusion: All the patients presenting with acute myocardial infarction with previously undiagnosed diabetes mellitus need to be screened for underlying diabetes mellitus.
Keywords: Acute myocardial infarction, Oral glucose tolerance test, Impaired glucose tolerance

INTRODUCTION

Major advances in cardiovascular disease, and specifically the treatment of acute coronary syndrome (ACS), have had a significant impact on the morbidity and mortality of patients with acute myocardial infarctions (AMI). Despite these advances, diabetes continues to put patients with and without a prior history of myocardial infarction at significant cardiovascular risk[1,2]. In patients with both stable and unstable coronary artery disease (CAD), there is a high prevalence of diabetes and increased rates of both undiagnosed diabetes and impaired glucose metabolism such as impaired glucose tolerance (IGT) or impaired fasting glucose (IFG)[3-5]. 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 has diabetes or not[6-10]. The incidence of hyperglycaemia during an ST elevation myocardial infarction (STEMI) is significantly high[4]. In non-diabetic patients the magnitude of the rise in plasma glucose during the early phase of acute myocardial infarction has been attributed to the severity of heart failure. A casual plasma glucose level >11·1mmol/L at admission for acute myocardial infarction in non-diabetic patients occurs in about 20% of the patients; however, in only about 20% of these cases is it likely to be a manifestation of pre-existing diabetes[11] when HbA1C is used as a diagnostic criterion[12]. Acute hyperglycaemia is independently associated with impaired left ventricular function[13] and with a larger infarct size due to an increased incidence of the no-reflow phenomenon[14].

METHODOLOGY

The study was conducted in the department of Cardiology, Bahawal Victoria Hospital Bahawalpur from 1st May 2012 to 31st October 2012. In this duration, 531 patients presenting with acute myocardial infarction with an elevated serum glucose level at the time of admission were included in the study. Out of these, 493 patients were subjected to oral glucose tolerance test (OGTT) one month after the acute event. The remaining 38 patients didn't come for follow up and were thus excluded from the study. The patients were divided into three groups

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1Associate Professor, 2,3Postgraduate Trainee, 4MO
Department of Cardiology, Quaid-e-Azam Medical College
– Bahawal Victoria Hospital Bahawalpur
Correspondence to Dr. Shehzad Ahmad, RMO, Email:
drshehzadahmadmalik@yahoo.com Cell: 03326375392

depending upon the results of OGTT; normal with 2 hours post load result of <7.8mmol/L, Impaired glucose tolerance having 2 hours post load value of 7.8–11mmol/L, and Diabetes mellitus with a 2 hours post load serum glucose level of ≥11.1 mmol/L[12]. The data was analyzaed using Statistical Package for Social Sciences (SPSS) version 10.

RESULTS

In our study, 62 % of the subjects (305 out of 493) with elevated serum glucose level at the time of admission had deranged glucose metabolism as diagnosed by subsequent OGTT. The criteria to be diagnosed as having diabetes mellitus was fulfilled by 137 patients (27.78 % of the total study population) as shown in Fig. 1. The differences in various parameters of the two groups (having either normal or deranged glucose metabolism) are shown in Table 1. Age of the patients, BMI, and the prevalence of hypertension and family history of diabetes mellitus were higher in the study group having deranged glucose metabolism, as well as the patients falling in this category were mostly males.

Fig. 1: Distribution of patients according to the results of OGTT (Labels show number of patients)
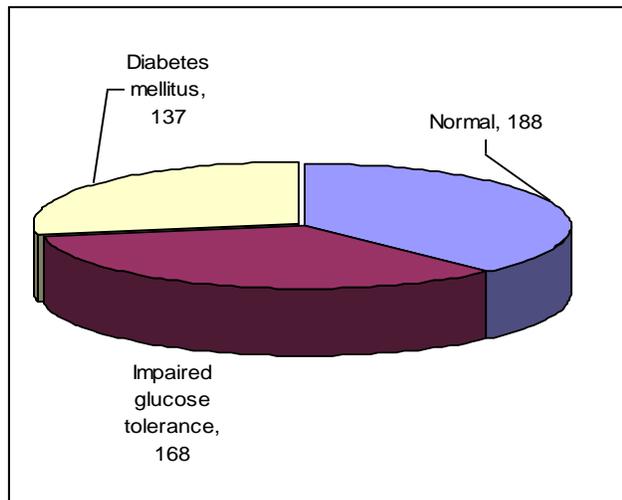

Table 1: Characteristics of the patients

	Normal Glucose metabolism	Deranged Glucose metabolism
Age (years)	49 ± 9	54 ± 8
Male	114	221
Female	74	84
BMI (kg/m^2)	23 ± 4	26 ± 3
Hypertension	35	49
Smoking	39	34
Family H/O diabetes	78	165

DISCUSSION

The patients with known or newly diagnosed diabetes are at particularly increased risk of adverse cardiovascular events.[4,5] In the setting of acute myocardial infarction, elevated serum glucose has been proposed to be pro-arrhythmic. This is consistent with the evidence that an acute increase of glycaemia in normal subjects produces a significant QT elongation.[15] In our study, 38% of the patients showed normal serum glucose on oral glucose tolerance test and 62% of the study population was categorized to be having disturbed glucose metabolism. The percentages were somewhat different than those reported by Mulder et al.[16] In our case, the percentage of patients showing normal seum glucose level on OGTT is higher and that falling in the category of impaired glucose tolerance (IGT) is lower as compared to the figures proposed by Mulder et al, the reasons for the differences remaining unrevealed. However a considerable number of patients with previously undiagnosed diabetes were found to be diabetic or having IGT. So the search for undiagnosed diabetes mellitus should be carried out in all the patients presenting with cardiovascular events and timely measures taken to prevent the worse outcome.

CONCLUSION

All the patients presenting with acute myocardial infarction with previously undiagnosed diabetes mellitus need to be screened for underlying diabetes mellitus.

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