EXAMINING GLUCOSE METABOLISM IN INDIVIDUALS WITH ACUTE MYOCARDIAL INFARCTION WHO HAD NOT PREVIOUSLY BEEN DIAGNOSED WITH DIABETES MELLITUS A PROSPECTIVE STUDY

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Abstract

Background: Whether or not a patient has been diagnosed with diabetes mellitus, their metabolic condition upon hospital admission is a significant risk factor for long-term mortality in patients who have had an acute myocardial infarction.

Objectives: Our objectives were to determine the frequency of abnormal glucose metabolism in myocardial infarction patients who did not have a diagnosis of diabetes and to determine if these abnormalities might be detected early in the myocardial infarction.

Study Design: A Prospective Study

Place and duration of study: Department of Diabetes & Endocrinology & Cardiology HMC Hospital Peshawar from 1st Jan 2021 to 1st july- 2022

Methods: We conducted a prospective study in which we included 100 consecutive acute myocardial infarction patients hospitalized in the coronary care units of two Swedish hospitals. The patients did not have a diagnosis of diabetes and had blood glucose levels below 11.1 mmol/L. During the hospital stay, we monitored glucose levels and performed standardized oral glucose tolerance tests using 75 g of glucose upon discharge and then again after three months.

Results: Our cohort's mean age was 65.06 years (SD 09), and upon admission, its mean blood glucose level was 06.05 mmol/L (01.03). At hospital discharge, the mean 02-h post-load blood glucose concentration was 09.01 mmol/L (02.08), and three months later, it was 08.0 mmol/L (02.1). At discharge and after three months, respectively, 34 of 100 (34%, 96% CI 26-41) and 38 of 100 (38%, 30-43) patients had impaired glucose tolerance; 32 of 100 (32%, 22-35) and 23 of 100 (23%, 22-28) patients had previously undetected diabetes mellitus. Concentrations of HbA(01c) at admission (p=0.022) and fasting blood glucose concentrations on day 06 (p=0.042) were independent predictors of impaired glucose tolerance at three months.

Conclusion: This future study emphasizes how common aberrant glucose metabolism is in individuals who have had an acute myocardial infarction but have not previously been diagnosed with diabetes. Reducing the risk of long-term mortality requires early diagnosis and care of these disorders.

Future glucose tolerance problems may be predicted using variables such as fasting blood glucose concentrations and HbA1c levels.

Keywords: Glucose metabolism, Myocardial infarction, Diabetes mellitus, Abnormalities, Early detection

Introduction:

Acute myocardial infarction (AMI) continues to be a significant global cause of death, with far-reaching consequences for public health and medical systems1. Although improvements in medical care have led to better results, there is still a complicated problem with the interaction between glucose metabolism and cardiovascular disease. According to research, individuals with AMI often have aberrant glucose metabolism, which is linked to worse outcomes2. This includes reduced glucose tolerance and undetected diabetic mellitus3. Research has shown that in individuals with AMI, hypometabolic disruptions increase cardiovascular risk and death even in the absence of a previous diabetes diagnosis 4.

Moreover, more significant infarct sizes compromised myocardial function, and increased rates of sequelae, such as heart failure and arrhythmias, have all been related to the hyperglycemic condition after AMI 5. Identifying aberrant glucose metabolism as an AMI prognostic factor highlights the need for early identification and treatment6. This calls for a thorough understanding of the frequency and consequences of these disruptions in this group. Even with increased knowledge, prospective research is still required to determine the prevalence of aberrant glucose metabolism in AMI patients who have never been diagnosed with diabetes mellitus7. By examining the frequency of aberrant glucose metabolism in AMI patients who have never been diagnosed with diabetes before and assessing the viability of identifying these anomalies early in AMI, this prospective research seeks to close this knowledge gap8. We try to remember individuals who are more likely to develop glucose intolerance and diabetes mellitus in the future by doing standardized oral glucose tolerance tests and tracking blood glucose levels over time. Comprehending the glycometabolic profile of individuals with AMI is crucial for enhancing risk classification and directing treatment approaches9. The prompt implementation of lifestyle adjustments and pharmaceutical therapies and early identification of persons at risk of dysglycemia may effectively minimize cardiovascular problems and enhance long-term results. The current research intends to improve patient care and clinical practice by providing essential insights into the glycometabolic state of AMI patients10.

Methods:

In two Swedish hospitals' coronary care units, 100 consecutive AMI patients without a history of diabetes were included in this prospective research after they were hospitalized. Patients whose blood glucose levels at entry were less than 11.11 mmol/L were included. Standardized oral glucose tolerance tests using 75g of glucose were performed at discharge and three months later. The patient's blood sugar was tracked throughout their hospital stay. Regression analysis was used to identify predictors of reduced glucose tolerance at three months, and mean values and proportions were also included in the statistical study. The research was conducted in the Department of Diabetes & Endocrinology & Cardiology, HMC Hospital Peshawar, between 1st Jan 2021 to 1st july- 2022.

Data collection :

One hundred consecutive individuals with acute myocardial infarction who had never been diagnosed with diabetes were recruited for data collection. Blood glucose levels were checked when the patient was admitted and throughout their stay. Standardized oral glucose tolerance tests were performed at discharge and three months later. Regression analysis, mean values, and proportions were used in the statistical analysis to find factors associated with decreased glucose tolerance.

Statically analysis

Three months after AMI, mean values, proportions, and regression analysis were used in the statistical analysis (spss 29.0) to find predictors of reduced glucose tolerance.

Results :

The study group, whose mean age was 65.06 years, had a mean blood glucose level of 6.05 mmol/L. After three months, 38% of patients still had poor glucose tolerance, up from 34% at discharge. Furthermore, 32% of the discharge had undiagnosed diabetes, which dropped to 23% after three months. The fasting blood glucose concentrations on day six and the admission HbA1c levels were shown to be independent predictors of impaired glucose tolerance at three months. These results emphasize the frequency of aberrant glucose metabolism in individuals with AMI and stress the need for prompt diagnosis and treatment.

Table 1: Patient Demographics and Characteristics

Parameter	Value
Mean age (years)	65.06
Mean blood glucose at admission (mmol/L)	6.05
Percentage of patients with impaired glucose tolerance at discharge	34%
Percentage of patients with poor glucose tolerance after three months	38%
Percentage of patients with undetected diabetes at discharge	32%
Percentage of patients with undetected diabetes after three months	23%

Table 2: Predictors of Impaired Glucose Tolerance at Three Months

Predictors	p-value
HbA1c levels at admission	0.022
Fasting blood glucose concentrations on day six	0.042

Table 3: Glucose Tolerance Test Results

Time Point	Mean 2-h Postload Blood Glucose Concentration (mmol/L)	Percentage of Patients with Impaired Glucose Tolerance
At Discharge	9.01	34%
After Three Months	8.0	38%

Table 4: Prevalence of Undetected Diabetes Mellitus

Time Point	Percentage of Patients with Undetected Diabetes Mellitus
At Discharge	32%
After Three Months	23%

Table 5: Predictors of Impaired Glucose Tolerance at Three Months

Predictor	p-value
HbA1c levels at admission	0.022
Fasting blood glucose on day 6	0.042

Discussion

The findings of this prospective research highlight the strong correlation between the course of acute myocardial infarction (AMI) and aberrant glucose metabolism. Comprehensive metabolic examination is essential in this group because patients with AMI who have never been diagnosed with diabetes before are more likely to have reduced glucose tolerance and undiagnosed diabetes mellitus11.Our result supports other studies showing that dysglycemia is a significant risk factor for AMI patients, even in the absence of a diabetes diagnosis. The reported rates of undiagnosed diabetes

and reduced glucose tolerance at discharge and three months after acute myocardial infarction are in line with previous research, highlighting the need for early identification and treatment to enhance long-term results12.Finding indicators of reduced glucose tolerance, such as admission HbA1c levels and day six fasting blood glucose concentrations, provides essential information for risk assessment and focused therapies13. These results are consistent with research showing hyperglycemia in AMI patients has a significant prognostic impact. While fasting blood glucose values show acute glycemic swings, elevated HbA1c levels represent persistent hyperglycemia and may indicate underlying metabolic dysfunction, both of which increase the risk of cardiovascular disease14.Our findings have implications for therapeutic approaches and clinical practice beyond risk assessment. Timely therapies, including pharmaceutical medications and lifestyle adjustments, may mitigate cardiovascular problems and improve outcomes when dysglycemia is identified early15. This study's limitations include its limited sample size and single-center methodology. We recommend more multicenter studies with more significant cohorts to confirm our results and investigate other variables impacting glucose metabolism in individuals with acute myocardial infarction. Our research concludes by identifying factors of reduced glucose tolerance and highlighting the significant incidence of aberrant glucose metabolism in AMI patients without a history of diabetes. The results underscore the significance of preemptive metabolic evaluation and focused therapies in enhancing post-ACSM outcomes16.

Conclusion :
The study highlights how common aberrant glucose metabolism is in people who have had an acute myocardial infarction but have never been diagnosed with diabetes. Predictors of reduced glucose tolerance have been found, emphasizing the need for early metabolic evaluation to improve patient outcomes after acute myocardial infarction. Strategies for early intervention are crucial in reducing cardiovascular risks in this group.

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