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Original Research Article

An Investigation of the Complications and Mortality Rates Associated with Acute Myocardial Infarction in Diabetics: A Comparative Study

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Abstract

Aim: The aim of the present study was to compare complications and mortality in AMI patients with diabetes and without diabetes

Material & Methods: A comparative study carried out at Department of General Medicine, ESICMCH, Bihta, Bihar, India during the duration of 5 months. Study population was adult patients admitted with Acute myocardial Infarction. 50 diabetic AMI and 50 non-diabetic AMI were studied in the study for post AMI complication and mortality.

Results: Group-1 has 50 cases (35 men, 15 females) while group-2 has 50 (40 males, 10 females). Most diabetics and nondiabetics were 45–54 years old. Men and women with diabetes had mean random blood sugar levels of 236.6±94.82 and 246.64±84.26, respectively. Stable angina was more common in non-diabetics (64%), unstable angina and MI in diabetics (26% and 18%). A substantial correlation exists between AMI types in diabetic and non-diabetic patients (P<0.001). Overall, 40 (80%) diabetics developed problems. 30 (60%), non-diabetics, had problems. Pump failure and sinus tachycardia were the most prevalent diabetes complications. Non-diabetics had sinus tachycardia most often, followed by bradycardia. A substantial link exists between diabetes and complications (p<0.05).

Conclusion: The research found that diabetics had greater post-MI problems and mortality than non-diabetics.

Keywords: Diabetes mellitus, complications, AMI

Introduction

Diabetes is a two- to four-fold risk factor for coronary heart disease, the primary cause of mortality among diabetics, and its prevalence is rising globally. [1] Diabetes patients still had four times the AMI rate of non-diabetics. [2-6] Coronary heart disease is the primary cause of mortality among diabetics. [5,7] The mortality rate following AMI in diabetics is high [8], and a recent comprehensive analysis indicated no favourable temporal shift in the risk of death compared to non-diabetics. [9] Additionally, AMI costs more. It significantly affects diabetics' medical bills. [10,11]

Diabetics' short-term survival after AMI has been studied more than long-term mortality. Even research on long-term mortality post-AMI have shown discrepancies. [12-14] While instructive, two meta-analyses may not offer meaningful risk estimates in larger groups. [15,16] The first study included only randomised controlled trials (RCTs) and reported information on 11 trials, including 62,036 individuals from the Thrombolysis in Myocardial Infarction (TIMI) database, excluding many global trials and assessing mortality only one year post-ACS. [15] The second significant meta-analysis published 6298 patients with ST elevation myocardial infarction (STEMI) treated with PCI and stent implantation from 11 trials. [16]

Therefore, we compared complications and death in AMI patients with and without diabetes.

Material & Methods

A comparative study carried out at Department of General Medicine, ESICMCH, Bihta, Bihar, India during the duration of 5 months. Study population was adult patients admitted with Acute myocardial Infarction. 50 diabetic AMI and 50 non-diabetic AMI were studied in the study for post AMI complication and mortality.

Inclusion Criteria:

1. Patients with age more than 12 years.

2. Patients with diabetes as cases and non-diabetic patients as control group

3. Patients willing to participate in the study

Exclusion Criteria:

1. Patients with age above 12 years

2. Patients having impaired Fasting Glucose [FPG < 126mg/dl. But > 110 mg/dl, PP-PG 140 –200mg/dl]

Methodology

The institute's ethics committee authorised the study. They gave written permission after being told about the project. AMI was investigated in 200 cases: 100 diabetic (Group 1) and 100 nondiabetic (Group 2). Random sampling is used. Group 1 includes AMI patients who were previously diabetes or initially diagnosed diabetic by ADA criteria in 2018. Group 2 includes non-diabetic myocardial infarction patients who did not meet ADA requirements. The questionnaire was pretested. After meeting inclusion/exclusion criteria, patients were recruited. Clinical history was detailed. History included diabetes duration and management, smoking, hypertension, and IHD family history. Previously recognised hypertension or diabetes problems. A thorough clinical evaluation was done. Pulse and BP were checked for hypertension/hypotension. Regular blood, urine, RBS, FBS, PPBS, and Glycosylated Hb tests were done. The lipid profile, renal function, and fundus were checked. Medical staff steadied patients. The reported complications included pump failure (LVF ± Cardiogenic shock), rhythm abnormalities (Ventricular/Atrial), and co-morbid complications including stroke. Both groups were compared for complications and death.

Statistical Analysis

Data was entered in excel sheet. Data was analysed with SPSS version 22.

Results

Table 1: Distribution of diabetic and non-diabetic patients according to age and sex

Age group (years)	Diabetic		Non- Diabetic		Total
	Male	Female	Male	Female	
35 – 44	3	1	1	1	6
45 – 54	14	3	12	5	34
55 – 64	7	6	17	2	32
65 – 74	8	3	6	1	18
75 and above	3	2	4	1	10
Total	**35**	**15**	**40**	**10**	**100**

Group-1 consists of 50 cases (35 males and 15 females) and group- 2 consists of 50 cases (40 males and 10 females). Most of the patients in both group diabetic and nondiabetic belonged to age group 45 – 54.

Table 2: Random blood sugar levels according to diabetic status and sex

Groups	Males	Females	Total
Diabetics	236.6±94.82	246.64±84.26	238.6±92.8
Non-diabetics	129.7±64.6	125±44.26	126.64±54.7

The mean random blood sugar in diabetes group in male and female were 236.6±94.82 and 246.64±84.26 respectively.

Table 3: Distribution of patients according to type of CAD

AMI	Diabetic		Non-diabetic	
	N	%	N	%
Stable angina	28	56	32	64
Unstable angina	13	26	11	22
Myocardial infarction	9	18	7	14
Total	50	100	50	100

Maximum number of cases of Stable angina belonged to non-diabetic group (64%) and unstable angina and MI belonged to Diabetic group (26% and 18%) respectively. There was a significant association between types of AMI among the diabetic and the non-diabetic groups (P<0.001).

Table 4: Post MI complications and death in diabetic and non-diabetic patients

Complications	Diabetic			Non-diabetic		
	Total	Recover	Death	Total	Recover	Death
Sinus tachycardia	12	12	0	15	15	0
Pump failure (pulmonary edema/ cardiogenic shock/both)	14	6	8	6	1	5
Bradycardia	8	7	1	3	3	0
Fatal ventricular arrhythmia	2	1	1	4	1	3
Acute VSD/MR	2	1	1	0	0	0
Other stroke	2	1	1	2	0	2
Total	40	28	12	30	20	10

Overall, 40 (80%) diabetics developed problems. 30 (60%), non-diabetics, had problems. Pump failure and sinus tachycardia were the most prevalent diabetes complications. Non-diabetics had sinus tachycardia most often, followed by bradycardia. A substantial link exists between diabetes and complications ($p<0.05$).

Discussion

Global diabetes prevalence was 382 million in 2013 and is anticipated to reach 592 million by 2035. Aetiology of diabetes is now commonly established. Type 2 diabetes accounts for >85% of diabetes prevalence. Retinopathy, nephropathy, neuropathy, ischemic heart disease, stroke, and peripheral vascular disease may result from both types of diabetes. Diabetes' early morbidity, mortality, lower life expectancy, and financial and other expenses make it a public health issue. Over 95% of Indian diabetics have type-2 diabetes. Due to its slow development and lack of symptoms, the illness typically goes misdiagnosed for years. Although just a minority of fat persons are diabetic, approximately 90% of type-2 diabetics are obese. Nearly all type-2 diabetics have dyslipidemia, and diabetics with elevated cholesterol have 2-3 times the risk of AMI. [17]

Group-1 has 50 cases (35 men, 15 females) while group-2 has 50 (40 males, 10 females). Most diabetics and nondiabetics were 45–54 years old. Like our work, Malmberg et al. [18] found that females are often engaged. Men and women with diabetes had mean random blood sugar levels of 236.6±94.82 and 246.64±84.26, respectively. Stable angina was more common in non-diabetics (64%), unstable angina and MI in diabetics (26% and 18%). A substantial correlation exists between AMI types in diabetic and non-diabetic patients ($P<0.001$). Hong et al. [19] found that diabetics had a higher rate of acute coronary syndrome, unstable angina, and myocardial infarction.

Overall, 40 (80%) diabetics developed problems. 30 (60%), non-diabetics, had problems. Pump failure and sinus tachycardia were the most prevalent diabetes complications. Non-diabetics had sinus tachycardia most often, followed by bradycardia. A substantial link exists between diabetes and complications ($p<0.05$). The FAST-MI registry found that 37.5% of AMI patients had HF, which increased their risk of mortality during index hospitalisation (12.2% vs. 3.0%). [20]

The Multiple Risk Factor Intervention Trial (MRFIT) found that men with diabetes had a threefold higher risk of cardiovascular death (160 vs 53 per 10,000 person-years) despite controlling for age, race, income, cholesterol, blood pressure, and smoking. [21] The Framingham Study found that individuals with diabetes had higher death rates, re-infarction rates, and heart failure rates during and after their index event. [22] According to the FINMONICA Study, diabetic women had higher in-hospital and 1-year mortality rates, but diabetic males have greater total mortality owing to out-of-hospital fatalities. [23]

Conclusion

After comparing diabetics to non-diabetics, the current research came to the conclusion that diabetics had a much higher risk of post-myocardial infarction complications and mortality.

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