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Original Research Article

A Comparative Assessment of Outcome in Acute Myocardial Infarction among Diabetic and Non Diabetic Patients

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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 observational study was carried out at Department of pathology and Cardiology, PMCH, Patna, Bihar, India for the duration of 12 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 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. The mean random blood sugar in diabetes group in male and female were 236.6±94.82 and 246.64±84.26 respectively. 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). Among the diabetic patients total 40 (80%) patients had complications. In the non-diabetic patients' complications were observed in 30 (60%). Pump failure was most common complication followed by sinus tachycardia in diabetic patients. Among the non-diabetic patients, sinus tachycardia was most commonly observed followed by bradycardia. There was a significant association between diabetes and complications (p<0.05).

Conclusion: The present study concluded that Post MI complications and Mortality is significantly more among diabetics compared to among non-diabetics.

Keywords: Diabetes mellitus, complications, AMI

Introduction

The number of people with diabetes is increasing rapidly worldwide, and diabetes is associated with a two- to four-fold increased risk of coronary heart disease, and cardiovascular disease is the leading cause of death among diabetics. [1] The incidence of AMI in patients with diabetes remains four times higher than that of non-diabetics [2-4,6], moreover, coronary heart disease remains the leading cause of death in patients with diabetes [5,7], up to 40% of infected patients die before entering the hospital.[4] The mortality rate after AMI in patients with diabetes is high [8] and a recent systematic review found no positive temporal change regarding the risk of death after AMI among patients with diabetes compared to non-diabetics [9], moreover, the higher costs incurred due to AMI It has a significant impact on the total medical costs of diabetic patients. [10,11]

While many studies have examined survival following AMI among individuals with diabetes, the focus has been on short-term rather than long-term mortality. Furthermore, even those studies which assessed long-term mortality post-AMI have reported inconsistent findings. [12-14] Two meta-analyses have been performed to date and, whilst informative, their findings may not provide reliable risk estimates in broader populations. [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, and therefore excluded a large number of global trials whilst assessing mortality only as far as one year

post-acute coronary syndrome (ACS). [15] The other major meta-analysis included a select group of patients with ST elevation myocardial infarction (STEMI) treated with primary percutaneous intervention (PCI) and stent insertion from 11 studies and reported on 6298 patients. [16]

Hence the aim was to compare complications and mortality in AMI patients with diabetes and without diabetes.

Material & Methods

A cross sectional study carried out at Department of Pathology and Cardiology the duration of 12 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

A valid written consent was taken after explaining study to them. 200 cases of AMI were studied, out of which 100 cases are diabetic AMI (Group 1) and 100 cases are nondiabetic AMI (group 2). Sample is drawn by simple random technique. Previously known diabetic or first time detected diabetic by American diabetic association (ADA) criteria, 2018, presenting with AMI were included in group 1 and Cases presenting with myocardial infarction who are not known diabetics or not fulfilling ADA were included in group 2. Data was collected with pre tested questionnaire. After fulfilling the inclusion and exclusion criteria patients were recruited. Detailed clinical history was noted. History included duration and control of diabetes, presence of risk factors like smoking, hypertension, and family history of IHD. If any complications of hypertension or diabetes in past it was noted. A through clinical examination was done. Vital signs like pulse (rhythm disturbance) BP (look for hypertension/ hypotension) were noted. Routine investigations like Routine blood and urine RBS, FBS and PPBS And Glycosylated Hb was done. Lipid profile, renal function tests, fundus examination was done. Patients were stabilised by medical management. Complications observed were Pump failure (LVF ± Cardiogenic shock), Rhythm disturbances (Ventricular / atrial) and Co-morbid complication (e.g. Stroke). Outcome in both the group was compared in terms of complications and mortality.

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

Among the diabetic patients total 40 (80%) patients had complications. In the non-diabetic patients complications were observed in 30 (60%). Pump failure was most common complication followed by sinus tachycardia in diabetic patients. Among the non-diabetic patients, sinus tachycardia was most commonly observed followed by bradycardia. There was a significant association between diabetes and complications (p<0.05).

Discussion

The latest estimates show a global prevalence of 382 million people with diabetes in 2013, expected to rise to 592 million by 2035. The aetiological classification of diabetes has now been widely accepted. Type 1 and type 2 diabetes are the two main types, with type 2 diabetes accounting for the majority (>85%) of total diabetes prevalence. Both forms of diabetes can lead to multisystem complications of microvascular endpoints, including retinopathy, nephropathy and neuropathy, and macrovascular endpoints including ischaemic heart disease, stroke and peripheral vascular disease. The premature morbidity, mortality, reduced life expectancy and financial and other costs of diabetes make it an important public health condition. Type-2 diabetes accounts for over 95% of all diabetics in India. Due to its insidious onset and lack of alarming symptoms, the disease often remains undiagnosed for many years. Type-2 diabetes mellitus has significant relationship with obesity and almost 90% type-2 diabetics are obese although only a minority of obese people are diabetic. Dyslipidaemia is observed in practically all patients of type-2 diabetes mellitus and very high level of cholesterol in diabetics have 2-3 times higher AMI risk than non-diabetic individuals.[17]

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. Malmberg et al [18] noted the same results and noted that females are commonly involved, which is also seen in our study. The mean random blood sugar in diabetes group in male and female were 236.6±94.82 and 246.64±84.26 respectively. 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). Hong et al [19] reported similar results that is acute coronary syndrome that is unstable angina and myocardial infarction is more common in diabetic than non- diabetics.

Among the diabetic patients total 40 (80%) patients had complications. In the non-diabetic patients complications were observed in 30 (60%). Pump failure was most common complication followed by sinus tachycardia in diabetic patients. Among the non-diabetic patients, sinus tachycardia was most commonly observed followed by bradycardia. There was a significant association between diabetes and complications (p<0.05). The FAST-MI (French registry of Acute ST elevation or non-ST-elevation Myocardial Infarction) registry showed that 37.5% of AMI patients had HF; these patients, compared with MI patients without HF, had a significantly

increased risk of death during index hospitalization (12.2% vs. 3.0%). [20]

In the Multiple Risk Factor Intervention Trial (MRFIT), men with diabetes had a threefold higher absolute risk of cardiovascular death than non-diabetic men (160 vs 53 cardiovascular deaths per 10 000 person-years) even after controlling for age, race, income, cholesterol levels, blood pressure and smoking. [21] The Framingham Study 20-year follow-up similarly demonstrated that patients with diabetes not only had a higher mortality with their index event, they also had a higher incidence of re infarction and heart failure in the acute and post infarction periods. [22] The FINMONICA Study, which looked at out-of-hospital deaths as well as deaths from index admission, showed that while diabetic women have a higher in-hospital and 1-year mortality, diabetic men have a higher overall mortality due to out-of-hospital death. [23]

Conclusion

The present study concluded that Post MI complications and Mortality is significantly more among diabetics compared to among non-diabetics.

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