

Frequency of Acute Myocardial Infarction in Patients with Diabetes Mellitus

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ABSTRACT

OBJECTIVES: To determine the frequency of Acute Myocardial Infarction in patients with Diabetes Mellitus, and short term survival in these patients.

METHODOLOGY: This study included 100 patients, was carried out in department of Cardiology, Liaquat University Hospital Hyderabad. Diagnosed cases of type 2 Diabetes Mellitus (DM) requiring Hospitalization with ST elevation, myocardial Infarction and meeting the criteria were enrolled in the study. The final diagnosis of Acute Myocardial Infarction was made within 48 hours of admission. The blood glucose level and glycosylated haemoglobin (HbA1c) were checked to evaluate the glycemic status. The short term survival was evaluated by recording in-hospital mortality and mortality during follow-up period of 30 days; by contacting at their residential address or contact number.

RESULTS: In the present study total 100 consecutive diabetic cases with acute Myocardial infarction were selected. The males patients outnumbered females. On the ECG and echocardiogram findings 39% patients had anterior wall MI. All male (n=65) patients had short term mortality of 27.68%, stratification showed that 6.15% was between 1 -10 days, 9.23% between 11–20 days and 12.30% mortality was found between 21–30 days. The corresponding figures in female (n=35) patients was 25.33%, stratification showed 8.57% mortality between 1-10 days, 5.71% seen between 11-20 days and in the 11.4% mortality was noted between 21-30 days.

CONCLUSION: The short term mortality after acute myocardial infarction in diabetic patients is significantly high, both male and female suffer almost equally.

KEY WORDS: Diabetic Mellitus , Acute Myocardial infraction, Short term survival.

This article may be cited as: Soomro T, Memon AG, Memon S. Frequency of Acute Myocardial Infarction in Patients with Diabetes Mellitus. J Liaquat Uni Med Health Sci. 2016;15(01):35-9.

INTRODUCTION

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in Insulin secretion, Insulin action or both.¹ The global prevalence of Diabetes mellitus is expected to rise to 300 million, an increase of approximately 120% from 1995 to 2025.² The cross sectional survey conducted in rural and urban areas of Pakistan upon 5433 individuals showed 19% prevalence of Diabetes mellitus, which is in line with earlier studies.^{2,3}

Diabetes mellitus is a major risk factor for Coronary Artery Disease⁴ and is associated with a higher incidence of Myocardial Infarction (MI) and sudden death.⁵ Morbidity, mortality and re-infarction rate are higher following MI in Diabetic than Non-diabetic individuals with one-year mortality in this population as

high as 50%.⁶ Similarly the acute and long-term efficacy of reperfusion strategies has historically been worse in patients with diabetes.⁷ Despite evidence for improvement in outcomes from cardiovascular disease in the general population over the past 30 years, these benefits have not been paralleled in the diabetic population.⁸ Type 2 Diabetes is present in 10-30% of patients presenting with Myocardial Infarction and represents a major public health concern.⁹ Diabetic patients have a worse risk profile than non-diabetic patients, and several studies have shown that diabetes is an independent predictor of mortality after myocardial infarction.^{10,11} Malmberg, et al reported a significantly higher rate of mortality during Hospitalization in patients with Diabetes (2.9%) compared to those without diabetes (2.0%).¹² Few studies have examined the effects of Diabetes on short-term prognosis

following first Acute Myocardial Infarction.^{13,14} Most studies have shown that Diabetic patients who have suffered a first Acute myocardial Infarction have a significantly higher mortality rate than myocardial patients without Diabetes.^{15,16} Mortality rates in post Myocardial Infarction patients with Diabetes vary from 10.5% to 40% and are between 40% and 100% higher than post myocardial infarction patients without diabetes.¹⁷ The present study was conducted at tertiary care teaching hospital of Hyderabad to detect the frequency and short term survival of Myocardial Infarction in the Diabetic population. The objective of the present study was to determine the frequency of AMI in cases with T2DM and to determine the short term survival of AMI in cases with T2DM.

MATERIAL AND METHODS

Setting: Department of Cardiology, Liaquat University Hospital, Hyderabad.

Sample Size: 100 cases of type T2DM.

Sample technique: Non probability purposive.

Study Design: Descriptive case series.

Duration of Study: One year from January 2013 to December 2013.

Sample Selection:

Inclusion criteria:

- Known or newly diagnose cases of type 2 DM with AMI, of all age & either gender.

Exclusion criteria: The cases with

- Previous history of AMI.
- Congestive Heart Failure.
- Valvular Heart Diseases.
- CABG or Coronary Angioplasty.
- Congenital Heart Diseases.
- Cases who refuse to give written consent for participation in the study.
- The cases with type 1 and Gestational Diabetes.

Data Collection Procedure

Diagnosed cases of type T2DM requiring Hospitalization with ST elevation MI and meeting the criteria mentioned were enrolled in the study. An informed consent was taken from every patient or attendant of the patient after explaining the purpose of the study. The history was taken; related clinical examination and all equitable / baseline investigations had carried out. Work up done includes; ECG 6 hourly while cardiac enzymes done on arrival of the patient, repeated at 2, 4, 8, 12 and 24 hrs and Troponin T rapid assay. The final diagnosis of AMI was made within 48 hours

of admission on the basis of above mentioned work up. The blood glucose level and HbA1c was also check to assess the glycemic status. The short term survival was evaluated by recording in- hospital mortality and mortality during follow-up period of 30 days from the date of admission; by contacting at their residential address or contact number. The data was collected on pre-designed proforma.

Data Analysis

All the data was entered and analyzed in SPSS version 10.00. The mean \pm SD was calculated for quantitative variables, qualitative variables presented as frequency/percentage.

RESULTS

In the present study total 100 diabetic cases with AMI were selected, out of them male were found in the majority 65% as compare to female 35%, with the mean age 42.5 ± 10.8 and male / female ratio 13:7. **Table I.** The sign / symptoms found in that order were shortness of breathing (42%), chest pain (35%), while Sweating, Nausea / vomiting and Syncope, were noted in 24% , 21% and 14% respectively. **Table II.** On ECG and echocardiogram, anterior wall infarct was noted in 39% of patients, inferior wall MI in 27% , and posterior wall MI in 10% of the patients. The combined wall MI was found in 32% of cases. The left ventricle dysfunction on the basis of ECG was found in 49% of the cases. **Table III.** Biomarker, CK-MB was raised in 49% and normal in 51% of the cases. Troponin T was raised in 89% while 11% normal. **Table IV.** The mean duration of the diabetic mellitus was 7.52 years (\pm SD3.89). Raised random blood sugar (RBS) was present in 63%, and normal in 37% of the cases, raised fasting blood sugar (FBS) was seen in the 71% of the cases while in 29% FBS within normal range. 45% cases were found with the raised Glycosylated hemoglobin (HbA1c), while 55% were documented with normal Glycosylated hemoglobin (HbA1c). **Table V.** In the 65(100%) total male cases short term mortality was 27.68%, the stratification showed that 6.15% was between 1-10 days, 9.23% between 11–20 days and 12.30% mortality was found between 21–30 days. In 35 female patients, on other hand short term mortality was observed in 25.68%, after stratification the corresponding figures for female were 8.57% between 1-10 days, 5.71% between 11-20 days and in the 11.4% mortality was noted between 21-30 days. (Table I-V)

TABLE I: DEMOGRAPHIC DISTRIBUTION OF CASES (n=100)

| Characteristics | No. of pt (%) |
|--------------------|----------------|
| Gender | |
| Male | 65 (65.0%) |
| Female | 35 (35.0%) |
| Age (years) | |
| Mean (± SD) | 42.5 (±10.8) |
| Male: female ratio | 13:7 |

TABLE II: SIGNS/ SYMPTOMS OF THE CASES & LV DYSFUNCTION AND MI DISTRIBUTION AS PER ECG/ECHO FINDINGS

| Sign/ symptoms | Frequency | % |
|---|-----------|-------|
| Chest pain | 35 | 35.0% |
| Shortness of breathing | 42 | 42.0% |
| Syncope | 14 | 14.0% |
| Sweating | 24 | 24.0% |
| Nausea and vomiting | 21 | 21.0% |
| Lv Dysfunction and Mi Distribution as Per Ecg/ Echo Findings | | |
| Anterior wall MI | 39 | 39.0% |
| Inferior wall MI | 27 | 27.0% |
| Posterior wall MI | 10 | 08.0% |
| Combined wall MI | 32 | 32.0% |
| Left ventricle dysfunction | 49 | 49.0% |

TABLE III: DISTRIBUTION OF CARDIAC ENZYMES

| Enzyme | Raised No. of pt/% | Normal No. of pt/% |
|------------|--------------------|--------------------|
| CK-MB | 49/49.0% | 51/51.0% |
| Troponin T | 89/89.0% | 11/11.0% |

TABLE V: SHORT TERM SURVIVAL (n= 100)

| Days | Male n= 65 | | | | Female n= 35 | | | |
|--------------|------------|--------|-----------|--------|--------------|--------|-----------|-------|
| | Survival | | Death | | Survival | | Death | |
| | No. of pt | % | No. of pt | % | No. of pt | % | No. of pt | % |
| 1-10 | 61 | 93.84% | 04 | 6.15% | 32 | 91.42% | 03 | 8.57% |
| 11-20 | 55 | 84.61% | 06 | 9.23% | 30 | 85.71% | 02 | 5.71% |
| 21-30 | 47 | 72.30% | 08 | 12.30% | 26 | 74.28% | 04 | 11.4% |

DISCUSSION

Good and early Control of DM is associated with an improved Risk of CV morbidity and mortality,¹⁸ and as the prevalence of DM increases there will also be a corresponding increase in morbidity and mortality from CVD. In this study total 100 diabetic cases were selected with AMI, majority of them (65%) were male and (35%) female, with the mean age 42.5±10.8 and

TABLE IV: DURATION OF DIABETIC MELLITUS & DISTRIBUTION OF DIABETES WITH GLYCOSYLATED HAEMOGLOBIN (Hba1c)

| Diabetic | Duration Mean (±S.D) | | | |
|-------------------|----------------------|-------|--------------------|-------|
| Diabetic mellitus | 7.52 (±3.89) | | | |
| Diabetes | Raised n= 100 | | Normal n= 100 | |
| | No. of pt | % | No. of pt | % |
| FBS | 63 | 63.0% | 37 | 37.0% |
| RBS | 71 | 71.0% | 29 | 29.0% |
| | Raised No. of pt/% | | Normal No. of pt/% | |
| | Frequency | % | Frequency | % |
| HBA1c | 45 | 45.0% | 55 | 55.0% |

male / female ratio 13:7. In the study of H. L. Koek et al.¹⁹ reported mean age in the male were mean±SD68.7 ±11.0 and in the females mean ±SD 73.2 ± 10.3. In another study, Lina Jančaitytė et al,²⁰ reported mean ±SD as 57.11±0.58 in diabetic cases with MI. Clinical assessment of the cases in the study, performed by P. Yadav et al²¹ reported that chest pain was found as major symptom (94%), followed by 78% and 67% with breathlessness. and. Instead in our study we found major symptom as shortness of breath and chest pain next. PS Singh et al,²² reported that clinical presentation cases of with acute MI chest pain as a predominant symptom was present in 90% followed by sweating (75%), and breathlessness (60%). However majority of our patient were also in breathlessness that could be because of late arrival. As well as in this study according to signs/ symptoms shortness of breath was found most commonly (42%), followed by chest pain in 35% of the cases, while

Syncope, Sweating, Nausea and vomiting were noted with percentage of 14%, 24% and 21% respectively.²³ In diabetic group total of 45.1% cases were with STE MI, out of whom 29% were anterior wall MIs, 16% were inferior wall MI, and 29% cases suffered NSTEMI and 29% were diagnosed as ACS which in accordance with PS singh. Similarly in this study on ECG and echocardiogram findings 39% were noted with anterior wall MI, 27.0% with inferior wall MI, 10%

were with posterior wall MI and with combined wall MI were noted in 32%, on the basis of echocardiogram results 49% of the cases were recorded with left ventricle dysfunction here there is a difference. PS Singh et al,²² reported in their study positive troponin T test in 100% cases with acute MI. According to Ala Hussain Abbase Haider,²⁴ level of CK-MB divided into two groups, group with elevated CK-MB cases 35.7% and group with normal CK-MB cases 64.3%. In the present study cardiac enzyme CK-MB was raised in 49% and Troponin T raised in 89% of the cases. In the present study duration of the DM was noted as mean±SD 7.52±3.89. Raised RBS were noted in 63%, and normal was seen in the 37% of the cases, raised FBS was seen in the 71% of the cases while in 29% of the cases FBS was within normal range this also matches the Lina Jaccaityle. Vinita Elizabeth Mani et al,²⁵ reported mean of HbA1c in diabetic group 8.4 + 1.9% and in diabetic group the HbA1c levels ranged between 4.1% and 13%. While in this study 45% cases were found with the raised (HbA1c), while 55% cases were documented with normal (HbA1c). In the two studies performed by Miettinen H et al²⁶, and Vaccarino V et al²⁷ reported a higher short-term (hospital or 28-day) mortality in women. Many other studies have found that in hospital 28-day and 1-year mortality after AMI was approximately 1.5–2 times higher in diabetic group.^{26,28} Lina Jančaitytė,²⁰ reported 12% mortality in diabetic cases after 28 days of acute MI. It was also found in their study 9.6% mortality in diabetic group with acute MI, while other western series showed 8.2-10% mortality.^{29,30} As well as from the total 27.68% mortality, 6.15% was found between 1 - 10 days, 9.23% between 11 - 20 days and 12.30% mortality was found between 21 - 30 days. On other hand in all 35(100%) female cases short term mortality was seen in 25.33%. From this mortality rate, 8.57% was found between 1-10 days, 5.71% between 11-20 days and in 11.4% mortality was noted between 21-30 days. Survival is decreased in old cases (above the age 70) where hospital mortality ratio is 21% as compared to 2.8% among cases 60 years and less.³¹ DM is another feature that increases the mortality in cases with AMI.³¹ Norhammaret al,³² showed improved but still high short and long term mortality rates after MI in cases with DM.

CONCLUSION

1. In the present study we concluded that, Short term mortality increases with diabetes mellitus.
2. Male and female suffer almost equally
3. More studies should be done to devise methods to further improve short term mortality

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