

STUDY OF CLINICAL PROFILE OF MYOCARDIAL INFARCTION IN TYPE-2 DIABETES MELLITUS PATIENTS WITH GENDER DIFFERENCEMahesh Murthy Bedar Rudrappa¹, Ranganatha Mahalingappa², Pruthvi Baise Chandrappa³**HOW TO CITE THIS ARTICLE:**

Mahesh Murthy Bedar Rudrappa, Ranganatha Mahalingappa, Pruthvi Baise Chandrappa. "Study of Clinical Profile of Myocardial Infarction in Type-2 Diabetes Mellitus Patients with Gender Difference". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 19, May 12; Page: 5127-5134, DOI: 10.14260/jemds/2014/2564

ABSTRACT: BACKGROUND: Atherosclerotic heart disease in diabetes appears earlier in life, affects women almost as often as men and is more fatal. Commonly women are considered at lower risk of Coronary Artery Disease [CAD] morbidity and mortality than men, but it is now widely believed that diabetes erases this female advantage and increases the risk of CAD to a greater extent than in males. This study was done to show clinical profile, ECG and enzyme changes of male and female diabetic patients with myocardial infarction and to note the gender impact on outcome of myocardial infarction during hospital stay. **METHODOLOGY:** 100 male and 100 female diabetes mellitus patients who sustained myocardial infarction were studied with reference to the gender differences in their presentation, clinical parameters, in hospital complications and prognosis. **RESULTS:** The mean age of females was 59.8±11yrs and males 56.5±10yrs with history of hypertension in 46% females and 38% males. Obesity was seen in 20% of females vs.14% males and dyslipidemia in 74% vs.50%. HbA1c>8 was present in 98% females vs.60% males. Clinical signs like hypotension raised JVP, pulmonary edema and post MI complications were noted more in females. STEMI occurred in 80% of females and 86% of males. The overall mortality was 20% in females and 6% in males was statistically significant. **CONCLUSIONS:** Female diabetic patients presenting with myocardial infarction were older than their male counterparts with history of hypertension being more common in them. More number of female patients had dyslipidemia, higher HbA1c and obesity than males. Non-chest pain symptoms were more common in female diabetics and fatigue was observed more in them. Clinical signs on presentation were worse for females and post MI complications and the in-hospital mortality was higher in female patients than males.

KEYWORDS: Coronary artery disease; Myocardial infarction; Diabetes mellitus.

INTRODUCTION: Coronary heart disease (CHD) remains the major scourge of mankind, even though a lot of developments in the diagnosis, management and prevention of risk factors have taken place. Each year, about 9,00,000 people in USA experience acute myocardial infarction. Of these roughly 2,25,000 die, including 1,25,000 who die before obtaining medical care. Most of these deaths are arrhythmic in etiology.¹

Population surveys carried out in the last few decades indicates that the prevalence of CHD has increased at least two fold in last twenty years in both rural and urban populations of India. In the urban adult population between 25 and 65 years of age, the prevalence of CHD appears to be about 90/1000. CHD is 3-4 times less common in rural population with urban subjects.²

Diabetes puts patients at increased risk for CHD and associated complications. Compared with non-diabetics, diabetics have a 2 to 4 times increased rate of death from heart disease. Diabetes

ORIGINAL ARTICLE

has been called a CHD risk equivalent.³ Cardiovascular disease is responsible for a third of all deaths of women worldwide and half of all deaths of women over 50 years of age in developing countries.⁴

More than 9 million women aged 20 years or older have diabetes. Women with diabetes are at higher risk for heart disease than their male counterparts, among all women with CAD, the rate of MI and cardiac death is significantly higher for those who also have diabetes. Diabetic subjects are more likely to experience a myocardial infarction and diabetes remains an independent predictor for poor prognosis in thrombolytic era.⁵

The diffuse nature of arterial disease with accompanying metabolic derangement contribute to impaired compensatory mechanisms, increased infarct size and a disproportionately more substantial impairment of left ventricular function contribute to the increased mortality and morbidity. This study was taken up to show the differences in the clinical profile, in-hospital outcome and prognosis of male and female diabetic patients presenting with Myocardial infarction and compared with the data available from other studies.

MATERIAL AND METHODS:

Source of Data: The present study includes male and female patients who are either known diabetics or newly diagnosed to have diabetes that sustained myocardial infarction and admitted to hospital.

Method of Collection of Data: It is a hospital based study. Male and female Type 2 Diabetes patients in equal numbers have been taken as cases.

Sample Size: 100 patients (50 females and 50 males) who fulfilled the inclusion and exclusion criteria were studied extensively and their clinical profile investigations and relevant data were updated in the pretested proforma and the results were analyzed.

The diagnosis of diabetes mellitus was as per the WHO recommendation FBS >126 mg/dl and PPBS >200mg/dl. The diagnosis of myocardial infarction was made on typical clinical history, ECG findings suggestive of either ST elevation and Non ST elevation myocardial infarction, MI myocardial enzyme markers in the form of CK-MB and troponin-I.

Inclusion Criteria:

- Male and female adults less than 80 yrs. of age.
- Known Type 2 DM patients or patients who were newly detected to have Type 2 Diabetes according to the WHO criteria.
- Those who fulfil the diagnosis of myocardial infarction supported by the clinical symptoms, ECG and cardiac enzymes as suggested by the WHO.

Exclusion Criteria:

- Myocardial infarction without diabetes mellitus
- Serious co morbid conditions like sepsis, severe respiratory disorder which would otherwise alter the prognosis.

Protocol for the Study: Patients who fulfill the inclusion and exclusion criteria were included in the study and their presenting complaints, diabetic history if present, other significant past history, risk factors were analyzed and detailed general physical examination and systemic examination with special attention to cardiovascular system was done.

ORIGINAL ARTICLE

Investigations done apart from routine counts included Serials ECG's, Cardiac enzymes (CK-MB and Troponin I), Echocardiography, Chest X ray, Glycosylated Hemoglobin and Lipid profile. Complications like congestive cardiac failure, cardiogenic shock, recurrent angina infarction and arrhythmias, in hospital out come and the mortality if present were also noted. The data obtained from the above was filled in the master chart and analyzed further for their statistical significance.

Statistical Method Applied: The results were analyzed by calculating percentages, mean values Chi-square test and proportion test. Proportions were compared using Chi-square test of significance. A p value of less than 0.05 was considered statistically significant and less than 0.001 as highly significant.

OBSERVATIONS AND RESULTS:

Age in years	Females	Percentage	Males	Percentage	P value
≤ 40	2	4	4	8	>0.05
41-50	7	14	14	28	>0.05
51-60	21	42	14	28	>0.05
61-70	14	28	15	30	>0.05
>70	6	12	3	6	>0.05

Table 1: Age Incidence

Females were maximum in age group of 51-60 years (42%) followed by 61-70 years (28%). There were 2 females and 4 males in the group ≤ 40 years.

Risk factors	Females	Percentage	Males	Percentage	P value
Hypertension	24	48	21	42	>0.05
Family history	12	24	18	36	>0.05
Obesity	10	20	7	14	>0.05
Smoking	0	0	24	48	<0.05
Dyslipidemia	37	74	27	54	<0.05

Table 2: Risk Factors

- 23 females in ≥ 41 years age group had hypertension.
- Obesity was seen in 20% of females and 14% of males.
- Dyslipidemia was seen in 74% of females and 54% of males which is statistically significant.

Symptoms	Females	Percentage	Male	Percentage	P value 41 yrs.
Chest pain	25	50	42	84	<0.001
Breathlessness	25	50	11	22	<0.05
Palpitation	4	8	4	8	-
Giddiness	3	6	2	4	>0.05
Nausea/ vomiting	2	2	2	4	-
Epigastric pain	3	6	3	6	-
Fatigue	32	64	7	14	>0.001
Sweating	2	4	3	6	>0.05
Loss of consciousness	1	2	1	2	-

Table 3: Symptoms

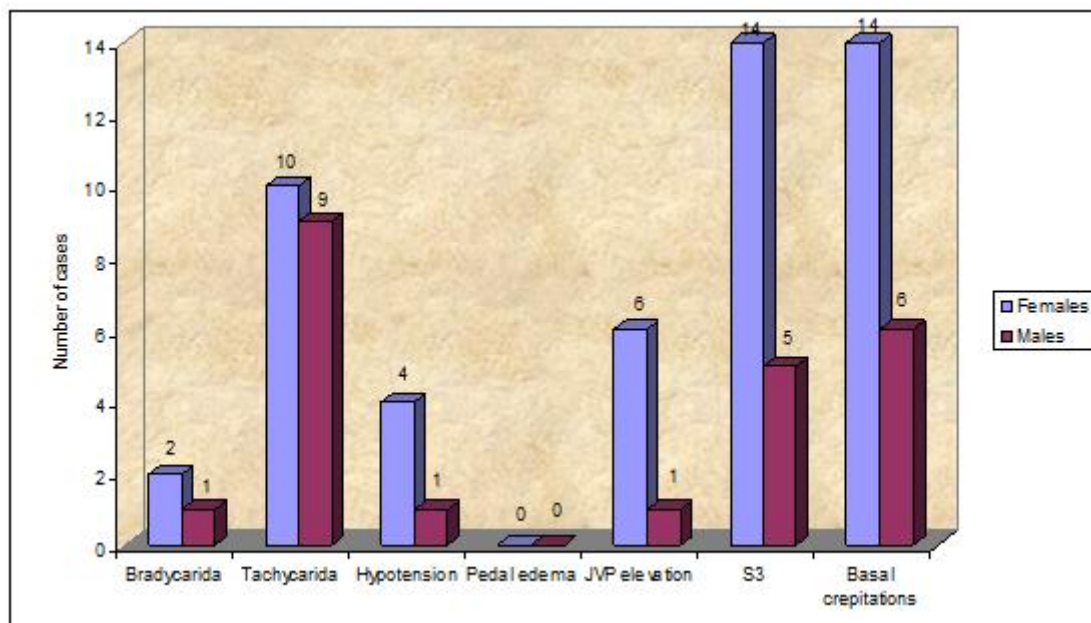
ORIGINAL ARTICLE

- In females chest pain was present in 50% of cases and in males 84% which is statistically significant.
- Breathlessness was complained by 50% of female and 22% of males which is statistically significant.
- Fatigue was complained by 64% of females and 14% of males which is statistically significant.

Physical signs	Females	Percentage	Males	Percentage	P value
Bradycardia	2	4	1	2	>0.05
Tachycardia	10	20	9	18	>0.05
Hypotension	4	8	1	2	<0.05
Pedal edema	0	0	0	0	-
JVP elevation	6	12	1	2	>0.05
S ₃	14	28	5	10	>0.05
Basal crepitations	14	28	6	12	<0.05

Table 4: Physical Signs

- Bradycardia was seen in 4% of females and 2% of males
- Tachycardia was observed in 20% of females and 18% males
- 8% of female patients had hypotension and 2% of male patients
- JVP was raised in 12% of female patient having and 2% of males
- There was 14 female patient having S₃ and 14 female patients having basal crepitation and among males 5 patients and 6 patients respectively.



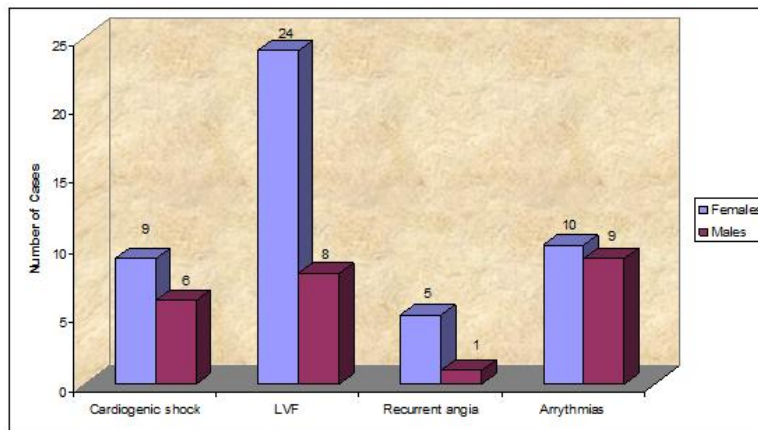
Graph 1: Physical Signs

ORIGINAL ARTICLE

Complications	Females	Percentage	Males	Percentage	P value
Cardiogenic shock	9	18	6	12	>0.05
LVF	24	48	8	16	<0.05
Recurrent angina	5	10	1	2	>0.05
Arrhythmias	13	26	7	14	>0.05

Table 5: Complications

- Cardiogenic shock was present in 18% females and 12% of males.
- CCF was observed in 48% females, 16% of males.
- Recurrent angina was present in 10% of females, 2% of males.
- Arrhythmias were seen in 26% of females and 14% of male patients.

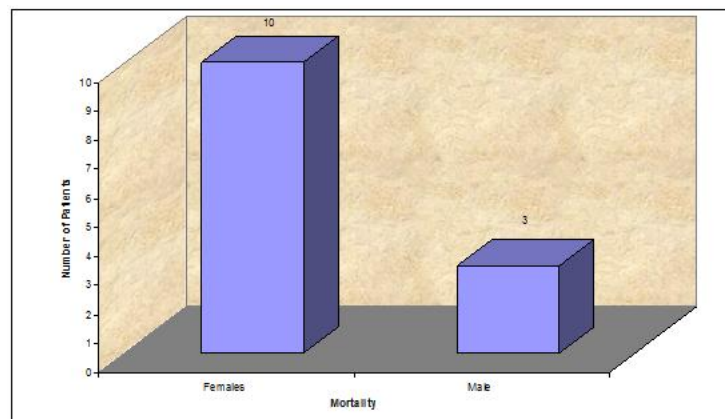


Graph 2: Complications

Mortality	Females	Percentage	Male	Percentage	P value
Numbers	10	20	3	6	<0.05

Table 6: Mortality

- Mortality among female was 20% and in males it was 6% with p value <0.05 which is statistically significant.



Graph 3: Mortality

ORIGINAL ARTICLE

DISCUSSION: In present study maximum number of patients was present between age group 51-70 years of which 35 female and 30 males. Alireza Esteghamati et al noticed that women were older than men in 60% of the patients with age range being (65 ± 11.6 for females vs. 59.2 ± 13 yrs. for males). The Hochman JS et al, had similar figures to support our data (average of 67 yrs. for females vs. 61 yrs. for males)⁶. Prior history of hypertension was present in about 48% of the females and 42% of males. This observation was compared with Hochman JS et al; study that showed that hypertension was present in 67.1% female diabetics vs. 38.6% in male diabetics.⁶ Obesity was present in 20% of females and 14% of males. Statistics shows $p < 0.008$ when obesity was compared between both sexes, which is again highly significant. This was compared with the reports given by Ramachandran et al⁷ where obesity was noticed in 19-20.7 % of female diabetics who present with coronary heart disease. It was noticed that 70% of females and 56% of males had abnormal total cholesterol levels (more than 200). Triglycerides were increased in 68% and 52% of males and females respectively.

The p value calculated was 0.507 for TC and 0.489 for Triglycerides, which was not statistically significant. According M. Nakhjavani et al, it was reported that women had bad lipid profile compared to men and the average values of total cholesterol reported in males and females were (233.7 mg/dl in females vs. 190.3 mg/dl in males) and triglycerides (219.7 mg/dl in females vs. 180.6 mg/dl in males).⁸ HDL was present in 34% of females Vs. 16% of males which is statistically significant with P value < 0.05 . LDL was present in 80% of females Vs. 54% of males which is statistically significant with P value < 0.05 .

F. Schiele et al, reported that mortality was increased to 18% in females vs. 6.1% in males if the presenting glucose was more than 126mg/dl in patients having acute coronary syndrome.⁸ In our study, 7 out of 9 female patients who died of MI the presenting glucose levels were > 300 and also in 2 males > 300 mg/dl. 20% of females Vs. 6% of males had glucose > 126 mg/dl which is statistically significant.

According to Stratton TM et al, 1% increase in glycosylated hemoglobin (HbA_{1c}) level was associated with a 14% increase in the incidence of myocardial infarction⁹. Also according to Sundar Natarajan et al, it was observed that female diabetics were less likely to have HbA_{1c} less than 7 when compared with their male counterparts.¹⁰

In our study it was observed that only 8 females and 11 males had HbA_{1c} levels less than 8 %. HbA_{1c} between 8.1-9 was in present 60% of females Vs. 40% of males and 9.1-10.0 was present in 34% of females and 16% of males.

Non-chest pain symptoms were noticed in 50 % of females and 16% of males in our study which is more than the values observed by Amber et al, [34% in females Vs.: 21% males]¹¹ According to Amber et al¹² fatigue was observed as a presenting complaint in 43% of females and 33% of males and in our study it was noticed that 64% of females and only 14% of males complained of fatigue. There is statistical significance for this data and the X^2 25.48 and $p < 0.0001$.

In the same study it was noticed that 67% of females and 61% males had breathlessness. In our study dyspnea was a presenting complaint in 50% of females and 22% of males, which was statistical significant.

Our study shows females diabetics with MI had worse clinical signs on presentation.

Tachycardia, bradycardia, hypotension, elevated JVP, pulmonary edema were noted more in females. Statistical significance was noted for elevated JVP, hypotension, basal crepts.

ORIGINAL ARTICLE

Females had complications like CCF in 48%, cardiogenic shock in 18% arrhythmias in 30% and recurrent angina in 12% and these findings when compared with that of males were significantly higher. We found statistical significance when occurrence of congestive cardiac failure between male and female patients was compared. [Y23.987 $p < 0.05$] but for other complications it was not significant. According to H. Mishra et al¹², the complication of congestive cardiac failure was seen in 44% of females and 25% of males.

According to Doteval A et al, 98 the incidence of STEMI was more common in female diabetics than non-diabetics and was noticed in more than 50% of total female patients. In our study 80% of females had STEMI. 86% of males had STEMI and the remaining 14% had NSTEMI. There was no significant difference in the rise of cardiac enzymes in both the sexes.

Our study showed mortality of 20% in females and 6% in males in the ≥ 41 age group. Here $X^2 = 1.923$ with $p < 0.05$ which is significant. Mortality according to Doteval et al 98 in diabetics was reported as 7.4% in females and 4.1% in males. Among female patients All 10 patients who died had congestive cardiac failure, 6 had arrhythmias, 3 had recurrent angina.

CONCLUSION: Female diabetic patients presenting with myocardial infarction were older than their male counterparts. Non-chest pain symptoms were more common in female diabetics than male diabetic patients having MI. Fatigue as a presenting complaint of coronary event was observed more in females. Hypertension and Dyslipidemia obesity was more common in female diabetic patients. Females had worse clinical signs on presentation than male patients of the same age group. Post MI complications like Congestive cardiac failure, cardiogenic shock, arrhythmias recurrent angina and mortality occurred more in females than in males.

BIBLIOGRAPHY:

1. ACC/AHA guideline for management of patients with acute MI. Quarterly Journal of Cardiology. Supplement 1997; 1-74.
2. Indian consensus group. "Indian consensus for hypertension and coronary artery disease". Indian Journal of Cardiology. 1998; 1 (1): 57-63.
3. Haffner SM, Lehto S, Rönnemaa T, Pyörälä K, Laakso M. Mortality from Coronary Heart Disease in Subjects with Type 2 Diabetes and in Nondiabetic Subjects with and without Prior Myocardial Infarction. N Engl J Med 1998; 339:29-234.
4. Louise Piolote, Kaberi Dasgupta et al. Comprehensive view of sex-specific issues related to cardiovascular disease. CMAJ March 13, 2007; 176 (6).
5. Shapiro E. The ECG and the arrhythmias: Historical insights, Chapter 1 in cardiac arrhythmias, their mechanisms, diagnosis and management, Philadelphia: JB. Lippincott Company, 3rd Ed., 1995; p.1-9.
6. Hochman JS, Tamis JE, Thompson TD, et al. Sex, clinical presentation, and outcome in patients with acute coronary syndromes. Global Use of Strategies to Open Occluded Coronary Arteries in Acute Coronary Syndromes II Investigators. N Engl J Med. 1999; 341:226-232.
7. Ramachandran A, Snehalatha C and Vijay Vishwanathan. Burden of Type 2 diabetes and its complications-the Indian scenario. Current Science, vol.83, no.12, 25 dec 2002.

ORIGINAL ARTICLE

8. M. Nakhjavani A. R. Esteghamati, F. Esfahanian, A. R. Heshmat. Dyslipidemia in Type 2 Diabetes Mellitus: More Atherogenic Lipid Profile in Women. *Acta Medica Iranica*, Vol. 44, No. 2 (2006) 115.
9. F. Schiele, V. Descotes-Genon, M. F. Seronde, M. C. Blonde, P. Legalery, N. Meneveau, F. Ecartot, M. Mercier, A. Penfomis, L. Thebault, D. Boumal. The prognostic value of blood glucose in diabetic patients with acute myocardial infarction. *Diabetic Medicine*, Volume 23, Issue 12, Page 1370-1376, Dec 2006.
10. Mc Sweeney JC, Cody M, O'Sullivan P, Elberson K, Moser DK, Garvin BJ. Women's early warning symptoms of acute myocardial infarction. *Circulation*. 2003; 108:2619-2623.
11. Amber S. Crowiey, Darleen Lessard, Robert J. Goldberg and Gail D' Onofrio. Sex-specific Differences in Presenting Symptoms of Diabetic and Nondiabetic Patients with Acute Myocardial Infarction and Their Relationship to in-hospital Mortality. *Acad Emerg Med* 2005 Volume 12, Number 5_suppi_1 34.
12. Mishra H., K.C. Samal, B.B. Tripathy. Management of Diabetes with Acute Myocardial Infarction (AMI). *Tnt J Diab Dev countries* (1995), vol. 1.

AUTHORS:

1. Mahesh Murthy Bedar Rudrappa
2. Ranganatha Mahalingappa
3. Pruthvi Baise Chandrappa

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of General Medicine, Shivamogga Institute of Medical Sciences, Shivamogga.
2. Assistant Professor, Department of General Medicine, Shivamogga Institute of Medical Sciences, Shivamogga.
3. Consultant Physician and Intensivist, Department of Internal Medicine, Shivamogga Institute of Medical Sciences, Shivamogga.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Mahesh Murthy B. R,
No. 110/1,
3rd Main, 1st Cross,
Siddeshwara Nilaya,
Shivamogga-577201.
Email: maheshvaidya26@gmail.com

Date of Submission: 18/04/2014.
Date of Peer Review: 19/04/2014.
Date of Acceptance: 26/04/2014.
Date of Publishing: 08/05/2014.