A Cross Sectional Study among Type 2 Diabetes Cases with Silent Myocardial Ischaemia in a Tertiary Care Center in a Northern Maharahstra

Rawandale Nirmalkumar[1], Patil Kanishk[2]

ABSTRACT

Introduction: Silent myocardial ischemia is defined as objective evidence of myocardial ischemia without angina or angina equivalent. In Framingham study, 30% of myocardial infarcts were silent, diagnosed only by serial electrocardiography. There is increasing evidence that asymptomatic myocardial infarctions and silent ischemia occur more frequently in diabetic patients. So present study was done to record the prevalence of silent myocardial ischemia in asymptomatic patients of type 2 diabetes mellitus.

Material and methods: The present study was a cross sectional study, carried out among 88 randomly selected patients of type 2 diabetes mellitus for more than 1 year, patients >18 years of age, who do not have any symptoms related to cardiovascular system.

Results: Our study shows that the prevalence of silent MI among patients with DM was 20.45%. It was reported in the present study that the mean fasting and post prandial blood sugar among patients was 162.23±12.18 mg/dl and 192.4±21.29 mg/dl respectively.

Conclusion: Our study shows that the prevalence of silent MI among patients with DM was 20.45%. In our study majority of cases of silent myocardial ischemia were found in patients with age group of >50 years, patients with duration of diabetes mellitus of 5-10 years.

Keywords: Diabetes Mellitus, Silent Myocardial Ischemia, Myocardial Infarctions, Cardiovascular Disorders

INTRODUCTION

Coronary artery disease has been called a modern epidemic because of its prevalence in different parts of the world. The manifestations of coronary artery disease embrace a wide spectrum from the benign minor coronary atherosclerosis without angina or ischemia to sudden death.[1] Silent myocardial ischemia is defined as objective evidence of myocardial ischemia without angina or angina equivalent. In Framingham study, 30% of myocardial infarcts were silent, diagnosed only by serial electrocardiography.[2,3] Cardiovascular diseases and particularly coronary heart disease (CHD) are the leading causes of death in patients with type-2 diabetes.[4,5]

Diabetic patients comprise a particularly high-risk group for subsequent cardiovascular events, with a propensity for silent myocardial ischemia.[6]

In one study, 12% of diabetic patients had silent ischemia, whereas 19% of the same patients had symptomatic ischemia.[7] Indeed, there is increasing evidence that asymptomatic myocardial infarctions and silent myocardial ischemia occur more frequently in diabetic patients.[8] The mechanisms for diminished angina in this group of patients include varying pain threshold sensitivity, autonomic neuropathy, and psychological factors.[9]

The present study was conducted to find out prevalence of silent myocardial ischemia in asymptomatic patients of type 2 diabetes mellitus and hence to analyze the ECG changes in silent myocardial ischemia/infarction in patients of type 2 diabetes mellitus.

MATERIAL AND METHODS

The present study was cross sectional, descriptive study carried out at tertiary care center in Northern Maharashtra from July 2018 to September 2018. The present study was conducted to know the ECG changes present in 88 randomly selected patients of type 2 diabetes mellitus for more than 1 year, patients >18 years of age, who do not have any symptoms related to cardiovascular system admitted under Department of Medicine were included in the study. Patients with history of myocardial infarction, uncontrolled blood pressure and other chronic diseases, Patients with type 2 diabetes mellitus with duration of less than 1 year, Patients with previous coronary artery bypass surgery, Patients with type 1 diabetes mellitus or Patients suffering from cerebrovascular accident were excluded from the study. Informed consent was taken from all the patients. Cases (OPD and IPD) referred to department of Medicine, Shri Bhausaheb Hire Government Medical College, Dhule were studied. Type 2 Diabetes mellitus patients with more than 1 yr duration with age more than 18 yrs who do not have any complaints related to cardiovascular system were included in this study. All patients were assessed with detailed history, clinical examination and relevant investigations including resting ECG.

RESULTS

The present study was conducted among 88 asymptomatic patients of type 2 diabetes mellitus admitted under

[1]Associate Professor, Department of Medicine, Shri Bhausaheb Hire Government Medical College, Dhule, [2]MBBS, Shri Bhausaheb Hire Government Medical College, Dhule, India

Corresponding author: Dr NirmalKumar Rawandale, Associate Professor, Department of Medicine, Shri Bhausaheb Hire Government Medical College, Dhule 424001 (Maharashtra), India

How to cite this article: Rawandale Nirmalkumar, Patil Kanishk. A cross sectional study among type 2 diabetes cases with silent myocardial ischaemia in a tertiary care center in a Northern Maharahstra. International Journal of Contemporary Medical Research 2019;6(4):D18-D21.

DOI: http://dx.doi.org/10.21276/ijcmr.2019.6.4.49

Age group	Number of patients	Percentage
< 30	1	1.13%
31-40	5	5.68%
41-50	22	25%
51-60	42	47.72%
>60	18	20.45%
Total	88	100

Table-1: Distribution of cases according to age

Duration of DM (years)	No. of Patients	Percentage
1-5	26	29.54%
5-10	44	50%
>10	18	20.45%
Total	88	100

Table-2: Distribution of patients according to duration of diabetes Mellitus:

Investigations	Mean
FBS (mg/dl)	162.23± 12.18
PBS (mg/dl)	192.4 ±21.29
Hb1Ac %	7.28 ±0.69
LDL (mg/dl)	121.14 ±24.11
HDL (mg/dl)	41.6 ±5.12
VLDL (mg/dl)	37.58 ± 6.09
Total cholesterol (mg/dl)	200.32 ±21.76
Triglycerides (mg/dl)	164.17± 25.92

Table-3: Distribution of patients according to investigations:

Silent MI	No. of Patients	Percentage
Present	18	20.45%
Absent	70	79.54%
Total	88	100

Table-4: Distribution according to prevalence of silent MI among patients:

Age Group (years)	No. of Patients	Percentage
Upto 30	00	00.00
31-40	02	11.11%
41-50	05	27.77%
51-60	07	38.88%
>60	04	22.22%
Total	18	100%

Table-5: Distribution according to age prevalence of silent MI among patients:

ECG Changes	No. of Patients (n=18)	Percentage
ST depression + Symmetrical T wave inversion	15	83.33%%
Pathologic Q waves	03	16.66%
New onset Left Bundle branch block	02	11.11%

Table-6: Distribution according to ECG changes in silent MI among patients:

department of medicine in a tertiary healthcare center to study clinical presentation of silent myocardial ischaemia.

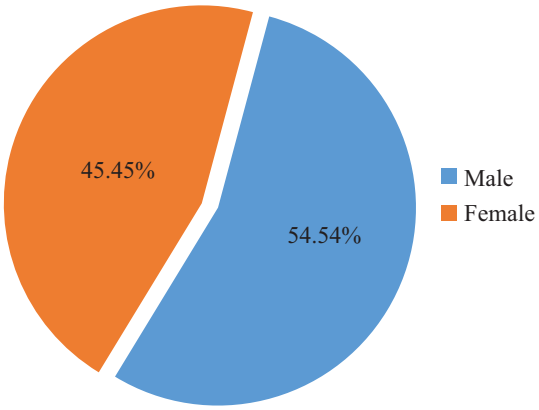

Figure-1: Distribution of patients according to sex

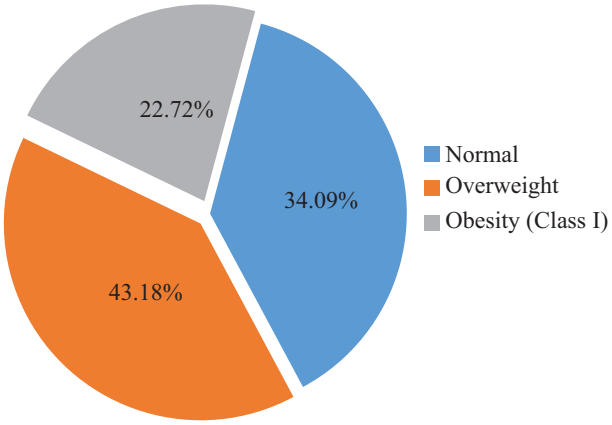

Figure-2: Distribution of patients according to BMI

We found that majority of patients were in age group 51-60 years (47.72%) followed by 41-50 years (25%) (Table 1) and male patients (54.54%) outnumbered female patients were 45.45% (Figure 1). It was noted that majority of patients were having DM since 5-10 years (50%). The patients with DM with duration of >10 years were 20.45% (Table 2). We recorded their anthropometric measurements and found that majority of patients were overweight (43.18%), followed by obesity class I (22.72%) (Figure 2). It was reported in the present study that the mean fasting and post prandial blood sugar among patients was 162.23±12.18 mg/dl and 192.4±21.29 mg/dl respectively (Table 3). It was observed that mean LDL, HDL, VLDL, total cholesterol and triglycerides levels among patients was 121.14 ±24.11 mg/dl, 41.6 ±5.12 mg/dl, 37.58 ± 6.09 mg/dl, 200.32 ±21.76 mg/dl, 164.17± 25.92 mg/dl respectively (Table 3). Our study shows that the prevalence of silent MI among patients with DM was 20.45% (Table 4). This study reports the prevalence of silent MI among DM patients was major in age group 51-60 years (38.88%) followed by age group 41-50 years (27.77%) (Table 5).

As one of the objective of this study, we assessed ECG changes among subjects. It was observed that majority of silent MI patients had ST depression with symmetrical T wave inversion (83.33%), pathological Q waves were obsesrved among 16.66% cases The new onset left bundle branch block (LBBB) was observed in 11.11% patients. ECG changes suggestive of ST elevation were not found (Table 6).

DISCUSSION

The present cross sectional study was conducted in SHB

Government Medical college, Dhule which on majority caters tribal population of northern Maharashtra, to know the ECG changes present in patients of type 2 diabetes mellitus who do not have any symptoms related to cardiovascular system.

We found that majority of patients were in age group 51-60 years (47.72%) followed by 41-50 years (25%) (Table 1) and male patients (54.54%) outnumbered female patients were 45.45%. In a study done by Sahil Gupta et al[10] on evaluation of ECG abnormalities in patients with asymptomatic type 2 Diabetes Mellitus observed mean age of asymptomatic diabetic patients was 50.3±11.90 years (Age range 25-75 years).

We recorded their anthropometric measurements and found that majority of patients were overweight (43.18%), followed by obesity class I (22.72%) (Figure 2). It was reported in the present study that the mean fasting and post prandial blood sugar among patients was 162.23±12.18 mg/dl and 192.4±21.29 mg/dl respectively (Table 3). It was observed that mean LDL, HDL, VLDL, total cholesterol and triglycerides levels among patients was 121.14 ±24.11 mg/dl, 41.6 ±5.12 mg/dl, 37.58 ± 6.09 mg/dl, 200.32 ±21.76 mg/dl, 164.17± 25.92 mg/dl respectively (Table 3). Our study shows that the prevalence of silent MI among patients with DM was 20.45% (Table 4). This study reports the prevalence of silent MI among DM patients was major in age group 51-60 years (38.88%) followed by age group 41-50 years (27.77%)

This study conducted by Abhijit Patil et al, observed 40% subjects as overweight (40%) followed by obesity Class I (22%) and 22% prevalence of dyslipidemia (22%). They observed that mean fasting and post prandial blood sugar among patients was 164 ±15.18 mg/dl and 189.4 ±23.29 mg/dl respectively while mean LDL, HDL, VLDL, total cholesterol and triglycerides levels among patients was 118.14 ±24.2 mg/dl, 42.60±5.12 mg/dl, 35.68±7.09 mg/dl, 204.96 ±28.76 mg/dl, 166.17±31.92 mg/dl respectively. Their results were similar to the present study. In a study done by Sahil Gupta et al[10] it was observed that mean fasting blood sugar among patients was 205 ±91mg/dl, mean HDL levels 39.66 ±10.17mg/dl.

In the present study, it was observed that the prevalence of silent MI among patients with DM was 20%. In a study done by Sahil Gupta et al[10] on evaluation of ECG abnormalities in patients with asymptomatic type 2 Diabetes Mellitus observed 26% asymptomatic diabetics had ECG abnormalities. Motoji Naka etal[11] compared diabetic patients with non-diabetic control subjects with respect to the prevalence of silent myocardial ischemia observed 31% prevalence of silent myocardial ischemia diabetic patients.

It was observed that majority of silent MI patients had ST depression with symmetrical T wave inversion (83.33%), pathological Q waves were obsesrved among 16.66% cases The new onset left bundle branch block (LBBB) was observed in 11.11% patients. ECG changes suggestive of ST elevation were not found. In a study done by Sahil Gupta et al[10] on evaluation of ECG abnormalities in patients with asymptomatic type 2 Diabetes Mellitus observed most common abnormality observed was ST-T changes (12%) followed by LAE(6%), LVH (4%), LBBB (2%) and RBBB (2%).In a study by Sellers MB et al[12] on African Americans, the variants and prevalence of ECG abnormalities detected were as follows: prolonged QTc (25.5%), T wave changes (22%), LVH (18.5%), sinus tachycardia (15.5%), Ischaemic Heart Disease (IHD) (9%), conduction defects (7%) and ectopic beats (4%). ECG abnormalities among older diabetics were high and included prolonged QTc, LVH, IHD and conduction defects.

Diabetes mellitus (DM) has been known for many years to be associated with poor cardiovascular prognosis. Due to the sensory neuropathy, the coronary artery disease in diabetic patients is frequently asymptomatic. Other cardiac investigations are also studied for silent myocardial ischemia.

CONCLUSION

Diabetes mellitus has been known for many years to be associated with poor cardiovascular prognosis.

In our study majority of cases of silent myocardial ischemia were found in patients with age group of >50 years, male patients, patients with duration of diabetes mellitus of 5-10 years.

Diabetes mellitus causes both microvascular and macrovascular complications. Due to the sensory neuropathy, the coronary artery disease in diabetic patients is frequently asymptomatic.

REFERENCES

1. WHO Expert Committee. Prevention of Coronary Heart Disease. WHO Tech. Rep. Ser., 1982; 678.
2. Kannel, W.B. and Abbott, R.D. Incidence and prognosis of unrecognised myocardial infarction; an upda1te on Framingham Study. N. Engi. J. Med., 1984; 311: 1144.
3. Pyorolla, K., Epstein, F.H. and Kornitzer, M. Changing trends in coronary heart disease mortality, possible explanation. Am. J. Cardiol., 1985;72: 1.1.
4. Stamler J, Vaccaro O, Neaton J, Wentworth D, for the multiple risk factor intervention trial research group: Diabetes, other risk factors and 12 year cardiovascular mortality for men screened in the multiple risk factor intervention trial. Diabetes Care 1993;16:434-444.
5. Manson JE, Colditz GA, Stampfer MJ, et al: A prospective study of maturity onset diabetes mellitus and risk of coronary heart disease and stroke in women. Arch Intern Med 1991;151:1141-1147.
6. Kokot T, Nowakowska-Zajdel E, Muc-Wierzgon M, et al. Impaired fasting glucose and silent myocardial ischemia. Pol Arch Med Wewn. 2005;114:1066–71.
7. DeLuca AJ, Saulle LN, Aronow WS, Ravipati G, Weiss MB. Prevalence of silent myocardial ischemia in persons with diabetes mellitus or impaired glucose tolerance and association of hemoglobin A1c with prevalence of silent myocardial ischemia. Am J Cardiol. 2005;95:1472–4.
8. Stone PH. Asymptomatic myocardial ischemia in stable angina, unstable angina, and myocardial infarction: Current status and future directions. Cardiol Rounds. 1998;2:1–8.
9. Fornengo P, Bosio A, Epifani G, Pallisco O, Mancuso A, Pascale C. Prevalence of silent myocardial ischaemia in new-onset middle-aged type 2 diabetic patients without other cardiovascular risk factors. Diabet Med. 2006;23:775–9.
10. Sahil Gupta, Rajeev KumarGupta, Malini Kulshrestha,

Rajib Ratna Chaudhary Evaluation of ECG Abnormalities in Patients with Asymptomatic Type 2 Diabetes Mellitus Journal of Clinical and Diagnostic Research. 2017;11:OC39-OC41.

11. Motoji Naka. Silent myocardial ischemia in patients with non-insulin-dependent diabetes mellitus as judged by treadmill exercise testing and coronary angiography. Diabetes and silent myocardial ischemia. 1991; 123 :46-53
12. Sellers MB, Divers J, Lu L, Xu J, Smith SC, Bowden DW, et al. Prevalence and determinants of electrocardiographic abnormalities in African Americans with type 2 diabetes. J Epidemiol Glob Health. 2014;4:289-96.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 10-03-2019; **Accepted:** 30-03-2019; **Published:** 04-05-2019