



A COMPARATIVE STUDY OF CORONARY ARTERY DISEASE IN DIABETICS AND NON-DIABETICS

Dr.Siram Sruthi Reddy*

III year post-graduate, Department of General Medicine, Santhiram Medical College and General Hospital, Nandyal. *Corresponding Author

Dr. G. Vijaya Kumar

Professor & HOD, Department of General Medicine, Santhiram Medical College and General Hospital, Nandyal.

Dr. B. Sarath Kumar Reddy

Assistant Professor, Department of General Medicine, Santhiram Medical College and General Hospital, Nandyal.

ABSTRACT **BACKGROUND:** Cardiovascular diseases account for the most significant burden of mortality and morbidity worldwide. Diabetes and dyslipidemia are independently major risk factors in macrovascular disease, but the risk is significantly increased when they occur together. Dyslipidemia is observed in practically all patients of type-2 diabetes mellitus and has 2-3 times higher CAD risk than non-diabetic individuals.

In diabetes cardiac involvement, commonly manifests as CAD and less commonly as dilated cardiomyopathy and autonomic cardiovascular neuropathy.

AIM:

- To compare the spectrum of clinical presentation of CAD among diabetics and non-diabetics. To study the demographic variables (age and sex) among the two groups.
- To study the difference in risk factors of CAD (smoking/hypertension/family history of IHD /dyslipidemia/obesity) between diabetic CAD and non-diabetic CAD.
- To compare the clinical course and complications of CAD among these two groups.

MATERIALS AND METHODS: A hospital-based cross-sectional, descriptive, observational study was conducted in the Department of Medicine, Santhiram medical college, and the general hospital for six months. Patients known as diabetic and patients who are not known as diabetic presenting with CAD were taken for the study with informed and written consent taken from the patient.

RESULTS: Male to female ratio in group-1 was 2.3:1, and in group -2, it was 1.7:1. Females were commonly affected in the diabetic group than non-diabetic group. Diabetics are more obese than non-diabetics. Systolic BP was higher among people with diabetes than non-diabetics (135.8±25.3mmHg Vs 124.9±22.4mmHg). Diabetic had higher BMI than non-diabetics.

CONCLUSION: CAD in diabetics had higher per cent of unpredictable presentation and have a higher risk factor profile and poor clinical outcome.

KEYWORDS :

INTRODUCTION

Coronary artery disease (CAD) has emerged as a leading cause of morbidity and mortality in the world and more in developing countries like India. Major risk factors for coronary artery disease include smoking, hypertension, diabetes mellitus, dyslipidemia, family history of CAD, and obesity¹. Diabetes mellitus is one of the important and independent predictors of mortality in CAD². It is estimated that about 100 million population is affected by diabetes worldwide³. In India, diabetes affects 2% of rural and 5.7% of urban population⁴. It is estimated that around 28 million Indians who are diabetics. Type-2 diabetes accounts for over 90-95% of all diabetes in India. Due to insidious onset and lack of alarming symptoms, the disease often remains undiagnosed for many years. Diabetes and dyslipidemia are independently major risk factors in macrovascular disease⁵. Still, when they occur together, the risk is significant and adverse effects of diabetes on serum lipids are more pronounced than in normal subjects. Dyslipidemia is observed in practically all patients of type-2 diabetes mellitus, and a very high level of cholesterol in diabetes have 2-3 times higher CAD risk than non-diabetic individuals. In diabetes, cardiac involvement commonly manifests as CAD and less commonly dilated (diabetic) cardiomyopathy and autonomic cardiovascular neuropathy⁶. Type-2 diabetes mellitus is the commonest type of diabetes in India. It gives rise to numerous complications, out of which coronary artery disease is an important one, which is the leading cause of death in diabetes⁶.

AIMS AND OBJECTIVES :

- To compare the spectrum of clinical presentation of CAD among diabetes and non-diabetics. To study the demographic variables (age and sex), two groups.
- To study the difference in risk factors of CAD (Smoking / Hypertension/family history IHD / Dyslipidemia / Obesity, especially central obesity) between diabetic CAD and non-diabetic CAD.

- To compare the clinical course and complications of CAD among these two groups.

MATERIALS AND METHODS

A hospital-based cross-sectional, descriptive, observational study was conducted in the Department of General Medicine, Santhiram Medical College, and General Hospital for six months after obtaining approval from the Hospital Ethics and Research Committee.

SAMPLE TECHNIQUE AND SAMPLE SIZE: All the selected patients fulfilling the inclusion criteria admitted in Santhiram medical college and general hospital, Nandyal, were taken for study after taking prior informed consent.

Out of 120 cases of CAD were studied, 60 cases were diabetic CAD, and 60 were non-diabetic. Sample was drawn by simple random technique.

SAMPLING CRITERIA:

INCLUSION CRITERIA :

- 1) Group – 1 (Diabetic CAD): First time detected diabetic by American diabetic association (ADA) or previously known diabetic presenting with CAD
- 2) Group – 2 (Non-diabetic CAD).
 - a) Cases presenting with features of Ischaemic heart disease (IHD) who are not known diabetics or not fulfilling ADA criteria.
 - b) Cases presenting with CAD and reactive hyperglycemia with HbA1C – 6.3% or blood sugar coming to normal in the absence of OHA insulin on follow up, during a hospital stay.
- 3) All patients willing to give informed written consent.

EXCLUSION CRITERIA :

- 1) Patients having impaired Fasting Glucose (FPG < 126mg/dl, PP-

BG 140-200mg/dl) presenting with CAD.

2) All patients not willing to give informed written consent.

DATAANALYSIS :

In present study, values are expressed as mean ±1 standard deviation. Demographic characteristics of patients with or without diabetes and other unpaired variables are compared using the unpaired student 't' test. P values are calculated. In our study, strength of association is said to be significant if p-value ≤0.05.

RESULTS :

The study consists of two groups, i.e. Diabetic CAD (group-1) and Non-Diabetic CAD (group-2). Group 1 consists of 60 cases (42 males and 18 females) and Group 2 consists of 60 cases (38 males and 22 females).

Table 1: Age and Sex wise distribution of diabetic and non-diabetic cases with CAD

Age group (years)	Diabetics			Non-diabetics			Total
	Male	Female	Total	Males	Females	Total	
35-44	2	2	4	3	1	4	8
45-54	14	5	19	15	10	25	44
55-64	14	6	20	9	6	15	35
65-74	7	3	10	7	4	11	21
75 and above	5	2	7	4	1	5	11
Total	42	18	60	38	22	60	120
Mean±SD	56±8.7	55±10.2	55.7±9.5	55.6±9.5	54.2±9.1	55.6±9.32	--
'p' value	NS	NS	NS	NS	NS	NS	--

The age difference between two groups and the groups among sex wise, t-test shows an insignificant p value >0.05. Male to female ratio in group1 was 2.3:1, and in group 2 it was 1.7:1

Table 2: Distribution of CAD according to their types

CAD	Diabetic		Non-diabetic	
	Number	Per cent	Number	Per cent
Stable angina	33	55	40	66.6
Unstable angina	10	28.34	12	20
Myocardial infarction	17	16.66	8	13.34
Total	60	100	60	100

p<0.001 Highly Significant

The maximum number of Stable angina cases belonged to the non-diabetic group(66.6%), and Unstable angina and MI belonged to diabetic group(28.34% & 16.66%). There was a significant association between types of CAD among diabetics and non-diabetics groups (p<0.001).

Among the established diabetes, mean duration of diabetes was 5.01±3.8 year (1 SD). For males, the mean duration of diabetes was 4.91±3.9 years (1 SD), and for females, it was 5.11±3.2 years (1 SD). The association between males and females in relation to the duration of diabetes among established diabetes is insignificant (P>0.05).

Among known diabetes, majority were taking oral hypoglycemic agents (OHA). 27% of known diabetes were taking insulin or a combination of insulin and OHA.

Among diabetic 26(43.3) were hypertensive, and among non-diabetic 15(25%) were hypertensive . Among non-diabetics 7(46.6) of males were hypertensive, and 8(53.3%) of females were hypertensive. Among diabetics 9(34.6%) of females were hypertensive, and 17(65.3%) of males were hypertensive by history.

Among the diabetic and non-diabetic cases, no significant association was observed with smoking or tobacco chewing or both.

Non-diabetics have a higher ideal body weight of 58.33% than diabetic 36.66%, whereas the proportion of over-weight people was the same in both groups.

There was no significant association between waist-hip ratio among diabetic and non-diabetics.

Both diabetic group and non-diabetic group had higher systolic blood pressure (p<0.01) and higher diastolic blood pressure (p<0.05).

There was no much difference between glycemic control among males and females. In the diabetic group, 21.7% had good control, 26.66% had fair control, and 51.64% had poor control of blood sugar on presentation.

Table 3: Lipid abnormalities among diabetics and non-diabetics

Level	Diabetic			
	Total Cholesterol	Triglyceride	HDL Cholesterol	LDL Cholesterol
	No of cases	No of cases	No of cases	No of cases
High Risk	8(13.33)	13(21.68)	21(35.0)	11(18.33)
Borderline	14(23.33)	16(26.66)	32(53.33)	24(40.0)
Low Risk	37(61.66)	31(51.66)	7(11.67)	25(41.66)
Non-diabetic				
High Risk	8(13.23)	2(3.33)	14(23.33)	15(25.0)
Borderline	21(35.0)	9(15.0)	31(51.66)	18(30.0)
Low Risk	38(63.33)	49(81.66)	15(25.0)	27(45.0)

Among the diabetic and non-diabetic groups, the maximum number of cases belonged to a low-risk category with total cholesterol, triglycerides, and LDL cholesterol, but with borderline risk with HDL cholesterol.

Table 4: Diabetic complications with respect to duration of diabetes

Complications	Duration of diabetes						Total	Per cent
	Newly	<1 year	1-3 years	3-5 years	5-10 years	>10years		
Constitutional symptoms	8	0	1	0	1	0	10	16.66
Stroke	0	0	1	1	0	0	2	3.33
Peripheral Neuropathy	0	0	3	1	0	0	4	6.66
Diabetic Ketoacidosis	1	0	1	0	0	0	2	3.33
Diabetic foot	0	0	0	1	0	0	2	1.66
Retinopathy	4	1	2	2	0	0	9	15

Among diabetic group, constitutional symptoms were found in 16.66% of cases and retinopathy in 15% of cases.

Table 5: Cardiac function as assessed by echocardiography

Cardiac function	Diabetic	Non-diabetic
	No of cases	No of cases
Systolic and diastolic function normal	8(13.3)	17(28.33)
Both systolic and diastolic dysfunction present	15(25.0)	20(33.33)
Systolic dysfunction only		
Mild	14(23.3)	7(11.66)
Moderate	6(10)	7(11.66)
Severe	5(8.33)	2(3.33)
Diastolic dysfunction only	12(20.04)	7(11.65)

Systolic dysfunction is commonly found in people with diabetes than non-diabetics.

DISCUSSION

Cardiovascular diseases including CAD, are more common among diabetics than non-diabetics. There was no significant difference between age in two groups (Diabetic and non-diabetic), i.e. p>0.05. Singer DE³ noted that diabetics were older, and Malmberg et al⁷. noted that females are commonly involved which agrees with our study. When age-wise cut-off is seen, maximum events occurred in 50-59 years in both diabetics and non-diabetics. Hence age is an important factor for CHD. In the GUSTO-1⁸ trail, when diabetes was considered, it was seen that diabetic MI patients were older compared to non-diabetic MI's. But such results were not obtained in our study. In our study, 55% had Stable angina, 28.34% had Unstable angina, 16.66% were detected to have MI in diabetes group, but only 15% were presented with diabetic retinopathy. When we considered a difference between mean systolic and mean diastolic BP among 2 groups, both systolic BP and diastolic BP was higher among diabetics. The GUSTO-1 trial showed that systolic BP was higher among diabetes and diastolic BP was equal in two groups. Insignificant association was noted between the waist-hip ratio among diabetic and non-diabetic groups. In our study diabetics had higher TG, lower HDL, lower LDL when compared to non-diabetics.

CONCLUSION

CAD in diabetics had a considerably higher percent of severe and unpredictable presentation. Diabetics had a higher risk factor profile and poor clinical outcome. Early diagnosis and appropriate management will reduce the risk of complication after the onset of disease⁹.

REFERENCES

1. Gaziano TA, Gaziano JM: Harrison's Principle of Internal Medicine 17th edition 2008 MC Graw Hill, Chapter 218: 1375.
2. American Diabetes Association: Management of dyslipidemia in adults with diabetes. Diabetes Care 24 (Suppl.1):S58-S61, 2001
3. DM, Meigs J, Singer DE, 'The epidemiology of Cardiovascular Disease in type 2 diabetes mellitus: How sweet it is / or is it. The Lancet 1997;350(s1):s14-8.
4. Ramachandran A, Vishwanathan M, Mohan V, Epidemiology of NIDDM in Indians. JAPI. 1993; Suppl 1:1-4.
5. Farmer JA: Diabetic dyslipidemia and atherosclerosis: evidence from clinical trials. Curr Diab Rep. 2008, 8: 71-77.
6. Ogurtsova K, da Rocha Fernandes JD, Huang Y, Linnenkamp U, Guariguata L, Cho NH, Cavan D, Shaw JE, Makaroff LE. IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. Diabetes Res Clin Pract. 2017; 128:40-50.
7. Malmberg K, Sakim Yusuf, H ertzcel C. Impact of Diabetes on Long-Term Prgnosis in patients with unstable angina and Non-Q- wave myocardial infarction. American heart association journals.org 2000; 102:1014-1019.
8. Mak K H, Granger C B, Miller D P, et al." Influence of diabetes mellitus on clinical outcome in the thrombolytic era of Acute Myocardial Infarction – GUSTO-1 Investigation " J.Am.Coll.Cardiol 1997;30:171-179.
9. Standards of medical care in diabetes -2012. Diabetes care. American Diabetes Association, 35(Suppl 1), S11-63.
10. Go AS, Mozaffarian D, Roger VL, Benjamin EJ, Berry JD, Borden WB, et al. American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics -2013 update: a report from the American Heart Association.Circulation .2013;127, e6-e245.
11. Singh RB, Niaz, MA. Coronary Risk Factors in Indians. The Lancet . 1995;346:778-2.
12. Grundy SM, Benjamin IJ, Burke GL, et al. Diabetes and cardiovascular disease: a statement for healthcare professionals from the American Heart Association. Circulation. 1999;100:1134-1146.
13. Hu FB, Stampfer MJ, Solomon CG, et al. The impact of diabetes mellitus on mortality from all causes and coronary heart disease in women;20 years of follow-up. Arch Intern Med.2001;161-1717-1723.
14. Juhan-Vague I, Alessi Mc. PAI-1, obesity, insulin resistance and risk of cardiovascular events. Thromb Haemostasis. 1997;78:656-660.
15. Mendis S, Puska P, Norrving B.(eds.). Global Atlas on Cardiovascular Disease Prevention and Control. Genova: World Health Organization.2011