

Clinical profile of type 2 diabetic patients with asymptomatic coronary artery disease

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Abstract

Depending on the etiology of diabetes mellitus, factors contributing to hyperglycemia may include reduced insulin secretion, decreased glucose utilization, and increased glucose production. The metabolic dysregulation associated with diabetes mellitus causes secondary pathophysiologic changes in multiple organ systems. Diabetes mellitus is the leading cause of end-stage renal disease (ESRD), non-traumatic lower extremity amputation and adult blindness. The patients of type 2 diabetes mellitus without clinical evidence of coronary artery disease attending diabetic clinic, cardiology and medicine OPD, at medical college and hospital were enrolled in the present study. The average glycosylated hemoglobin (HbA_{1c}) was 7.92, 7.78, 8.71 and 10.2 for the duration of diabetes equal to or less than 5 yrs, 6 to 10 yrs, 11 to 15 yrs and 16 to 20 yrs respectively. This shows that all patients had poor glycaemic control.

Keywords: Clinical Profile, Type 2 Diabetic Patients, Asymptomatic Coronary Artery Disease

Introduction

Diabetes mellitus comprises a group of common metabolic disorders that share the phenotype of hyperglycemia. Several distinct types of diabetes mellitus exist and are caused by a complex interaction of genetics, environmental factors, and life style choices. Depending on the etiology of diabetes mellitus, factors contributing to hyperglycemia may include reduced insulin secretion, decreased glucose utilization, and increased glucose production. The metabolic dysregulation associated with diabetes mellitus causes secondary pathophysiologic changes in multiple organ systems. Diabetes mellitus is the leading cause of end-stage renal disease (ESRD), non-traumatic lower extremity amputation and adult blindness^[1].

WHO conducted a multinational study in 14 countries to know about prevalence and mortality due to macrovascular complications especially due to CAD. In the cross-sectional part of the study conducted in, high prevalence, were found in diabetic patients from Switzerland, Berlin and London. Very low prevalence rates were found in diabetic patients from Tokyo and Hong Kong and in native Americans (Pima) from Arizona^[2].

The Asian Indian Paradox, higher rates of CAD in Asian Indians (AI) in the US are accompanied by paradoxically low levels of conventional risk factors. This is called the "Indian Paradox".

In India, an increase in the incidence of CAD has been observed in last 2 decades. Men in New Delhi were found to have 4 times higher incidence of CAD than in the Framingham mass (9.7 Vs 2.5%).

The hospitalization rates for CAD at C.M.C. Vellore has increased from 4% of all cardiac admission in 1960 to 33% in 1989. Among Indians CAD occurs at an earlier age, is very severe and generally follows a malignant course. There is a substantially higher prevalence of insulin resistance syndrome and diabetes among them^[3].

The total prevalence of diabetics in India was found to be 1.6% in 1986 in one series. NIDDM contributes about 95% of all the diabetic patients in India. In the same study the prevalence of IHD among diabetics was reported at around 17.8%.

In a study conducted by Ramachandran A. *et al.*, in a large population of South Indians they did an analysis to look for prevalence of CHD and cardiovascular risk factors. It was found that 37% of normoglycemic, 8% with IgT and 7.1 of diabetic people had IHD. High prevalence of CHD in IgT and DM is significant and suggest that the possibility of clustering of risk factor. The co-existence of risk factors namely syndrome-X were assessed in the form of central obesity, hypertension, dyslipidemia and hyperglycemia with hyperinsulinemia, were present in 35%^[4].

Methodology

Study design

The present study was a cross sectional study on the patients of type 2 diabetes mellitus without clinical and electrocardiographic evidence of coronary artery disease.

Source of data

The patients of type 2 diabetes mellitus without clinical evidence of coronary artery disease attending diabetic clinic, cardiology and medicine OPD, at medical college and hospital were enrolled in the present study.

Sample size

Total of 102 patients were included in the study.

The sample was calculated considering 80% of the average number of patients of type 2 diabetes mellitus without clinical evidence of coronary artery disease attending. Diabetic clinic, cardiology and medicine OPD over last three years.

Inclusion criteria

- Patients of type 2 diabetes mellitus without clinical evidence of coronary artery disease.
- Normal resting 12 lead electrocardiogram.
- No past history of ischemic heart disease, CYA and hypertension.

Exclusion criteria

1. Myocardial Infarction.
2. Unstable angina.
3. Left Bundle Branch Block.
4. Severe Left ventricular Hypertrophy.
5. Renal Disorders.
6. Febrile illnesses.
7. Patients with severe Osteoarthritis or other disabilities.
8. Abnormal resting ECG.

Data collection

All the patients attending to diabetic clinic and medicine OPD, were screened for eligibility. Informed consent was taken from the eligible patients and enrolled in the present study. The patients were interviewed and underwent thorough physical examination. Their Data comprising of name, age, sex, personal, occupational and proper history was recorded on the proforma. All of them had normal 12 lead ECG and underwent treat mill test.

Results

The mean age of the study subjects was 50.11 years; standard deviation (SD) of 7.95 years with a range of 26-65 years. Most of the patients belonged to the age group 36-55 years.

Table 1: Age & Sex Correlation

Age Group	Total	Male	Female
26-35	13	10	3
36-45	42	32	10
46-55	32	21	11
56-65	15	10	5
Total	102	73	29

13 patients in the study were in the age group of 26-35 years. Of these 10 were males and 3 were females. 42 patients were in the age group of 36-45 years. Of these 32 were males and 10 were females. 32 patients in the study were in the 46-55 age group, of these 21 were males and 11 were females. 15 patients were in the age group of 56-65 years, of these 10 were males and 5 was female. Most patients were between the age group of 36-55 years.

Table 2: Body Mass Index

BMI (kg/m ²)	Number of Patients	Percentage
Normal (18.5 -24.9)	32	31.37%
Overweight (25-29.9)	32	31.37%
Obese (30 and above)	38	37.25%
Total	102	100%

32 (31.37%) patients were with normal body mass index., 32 patients (31.37%) were overweight while 38 (37.25%) patients were obese.

Table 3: Average Glycosylated Haemoglobin

Duration of Diabetes	Number	Average HbA1C
More than 5	61	7.92
6-10	27	7.78
11-15	10	8.71
16-20	04	10.2

The average glycosylated hemoglobin (HbA1C) was 7.92, 7.78, 8.71 and 10.2 for the duration of diabetes equal to or less than 5 yrs, 6 to 10 yrs, 11 to 15 yrs and 16 to 20 yrs respectively. This shows that all patients had poor glycaemic control.

Table 4: TMT Results and Peripheral Neuropathy

Diabetic patients	TMT Positive (n=32)	TMT Negative (n=70)	Total (n=102)
With Peripheral Neuropathy	21(65.63%)	11(34.37%)	32(100%)
Without Peripheral Neuropathy	11(15.71%)	59(84.29%)	70(100%)

21 (65.63%) of the 32 diabetics with peripheral neuropathy had asymptomatic coronary artery disease while 11 (15.71%) of the 70 diabetics without peripheral neuropathy had asymptomatic coronary artery disease. This shows diabetes with peripheral neuropathy had higher incidence of asymptomatic coronary artery disease than those without it. (65.63% Vs 15.71%).

Table 5: Blood Lipid Profile

Duration of Diabetes	Cholesterol		TGL		LDL		HDL	
	Mean	Sd	Mean	Sd	Mean	Sd	Mean	Sd
More than 5	173.07	31.02	118.63	26.68	103.13	21.94	38.62	2.86
6-10	175.30	21.40	120.93	24.84	102.22	14.73	38.37	2.78
11-15	185.90	23.80	117.40	20.48	99.60	9.02	38.60	1.35
16-20	200.00	35.59	136.50	42.93	124.50	42.30	35.00	3.83

This table shows the blood lipid profile of the study subjects. Statistically there was no significant difference in average cholesterol, triglycerides, LDL and HDL with respect to the duration of diabetes mellitus ($p > 0.05$).

Discussion

India leads the world today with the largest number of diabetics in any given country. Although coronary artery disease (CAD) & diabetes mellitus have been recognized as distinct entities for many decades, but their correlation was established only in 1870 after the work of Seegen. J. De. who emphasized higher incidence and mortality of CAD among diabetics.

A recently observed and focused aspect of coronary artery disease is its silent and asymptomatic presentation. The present study was aimed at the asymptomatic presentation of coronary artery disease in diabetes mellitus patients. It consists of assessing the prevalence of asymptomatic coronary artery disease with normal resting ECG in diabetes mellitus, by seeking the TMT changes (positivity).

This study consisted of 102 known diabetics without clinical and electrocardiographic evidence of CAD and were evaluated for the prevalence of asymptomatic coronary artery disease by using exercise Tread mill testing^[5].

In this study, 73 were males and 29 were females with mean age of 50.11 years. Of the total, 32 patients (31.37%) were overweight, 38 patients (37.25%) were obese and remaining was with normal BMI.

In our study population, more number of patients (61 i.e. 59.8%) were having diabetes equal to or less than 5 years, followed by 27 patients (26.4%) with the duration of 6 to 10 years, next 10 patients (9.8%) between 11 to 15 years and only 4 patients (3.9%) between 16 to 20 years.

In our 102 patients, 2 (1.96%) was on diet control alone, 59 (57.8%) were on one or the other OHA's, 10 (9.8%) were on one or the other form of insulin while 31 (30.39%) were receiving both oral hypoglycemic agents and insulin.

Peripheral neuropathy is a common microangiopathic complication of diabetes. In the present study, it was found that 21 (65.63%) of the 32 diabetics with peripheral neuropathy had asymptomatic coronary artery disease while 11 (15.71%) of the 70 diabetics without peripheral neuropathy had asymptomatic coronary artery disease^[6].

Thus, in our study diabetics with peripheral neuropathy had a greater incidence of asymptomatic coronary artery disease than those without it (65.63% Vs 15.71%).

Our findings are in agreement with one study who found that silent myocardial ischemia was associated with presence of diabetic polyneuropathy^[7].

Conclusion

- The study group consisted of 73 males and 29 females with the mean age of 46.05 years.
- Majority of patients 38 (37.25%) in the present study were obese, 32 (31.37%) were overweight while 32 (31.37%) were in normal range of body mass index.
- In our 102 patients, 2 (1.96%) was on diet control done, 59 (57.8%) were on one or the other OHA's, 10 (9.8%) were on one or the other form of insulin while 31 (30.39%) were receiving both oral hypoglycemic agents and insulin.
- 61 patients (59.8%) were having diabetes equal to or less than 5 years, followed by 27 patients' (26.4%) with the duration of 6 to 10 years, next 10 patients (9.8%) between 11 to 15 years and only 4 patients (3.9%) between 16 to 20 years.

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