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Presence of diastolic dysfunction in newly diagnosed type 2 diabetes mellitus and its correlation with glycosylated haemoglobin (HBA1C)

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Abstract

Introduction: Diabetes mellitus is a heterogeneous group of metabolic disorders characterized by hyperglycemia with disturbances of carbohydrate, fat and protein metabolism caused by either lack of insulin secretion or decreased sensitivity of the tissues to insulin. Diabetes mellitus is a common endocrine disorder affecting around 387 million people worldwide. Diabetic cardiomyopathy is an independent cardiovascular disease and many underlying mechanisms such as microvascular disease, autonomic dysfunction, metabolic disorders and interstial fibrosis serve as etiological factors.

Aims and Objectives: To study the presence of diastolic dysfunction in newly diagnosed type 2 diabetes mellitus and its correlation with glycosylated haemoglobin(hba1c)

Materials and Methods: It was a case control study with 50 patients.

Inclusion Criteria

Newly diagnosed T2DM between age 30-60 yrs including both males and females who had no other cardiovascular involvement and BP<130/80 mm of hg and with normal ecg.

Diagnosis of diabetes was made on basis of clinical evaluation, biochemical tests like fasting plasma glucose, post prandial plasma glucose and HBA1C according to ADA guidelines.

Exclusion Criteria: Already diagnosed T2DM, Patients having cardiovascular diseases like valvular heart disease, ischemic heart disease, hypertensive heart disease, congestive heart failure and cardiomyopathy.,COPD, Severe Anemia , Haemoglobinopathies & Renal Failure.

Conclusion: This study shows that higher HbA1C level (more than 8.6±0.6) is strongly associated with presence of LVDD, considered as precursor of diabetic cardiomyopathy. HbA1C emerges as an important

indicator of diastolic dysfunction in early onset diabetic population in our study. Age at the time of diagnosis of type 2 DM was predicted as most important risk factor for LVDD in these newly diagnosed patients.

Introduction

Diabetes mellitus is a heterogeneous group of metabolic disorders characterized by hyperglycemia with disturbances of carbohydrate, fat and protein metabolism caused by either lack of insulin secretion or decreased sensitivity of the tissues to insulin.Diabetes mellitus is a common endocrine disorder affecting around 387 million people worldwide.[1]

Criteria for Diabetes Mellitus[2]

Symptoms of diabetes plus random blood glucose concentration ≥11.1 mmol/L (200md/dl) or

Fasting plasma glucose ≥ 7.0 mmol/L (126mg/dl) or

Two hour plasma glucose ≥ 11.1 mmol/L (200mg/dl) during an oral glucose tolerance test(1).

HbA1c> 6.5

Vascular complications both micro and macrovascular predominate the features of Indian diabetes due to delayed diagnosis. Various microvascular complications in diabetes mellitus includes[3]

Diabetic retinopathy

Diabetic nephropathy

Diabetic neuropathy

Diabetic Cardiomyopathy

Presence of microvascular complications at the time of diagnosis of diabetes mellitus are showing increasing trend in India. Early detection of microvascular complications and its treatment at this time by intensive therapy can prevent progression of these complications and hence morbidity and mortality among patients.

Newly Diagnosed T2dm

Those People Who Are Diagnosed With T2DM Within 3 Months Of Presentation As Per The ADA 2020 Guidelines.[3]LVDD- It refers to heart failure with preserved EF (EF>50%). T2DM is one of the major risk factor for diastolic dysfunction . Myocardial damage in diabetic patients affects diastolic function before the systolic function.[3]

Diabetic cardiomyopathy is an independent cardiovascular disease and many underlying mechanisms such as microvascular disease, autonomic dysfunction, metabollic disorders and interstial fibrosis serve as etiological factors.

Materials and Methods

Case control cross sectional type of study.

Sample Size-50 Patients.

Time Duration-6 months

Inclusion Criteria

Newly diagnosed T2DM between age 30-60 yrs including both males and females who had no other cardiovascular involvement and BP<130/80 mm of hg and with normal ecg.

Diagnosis of diabetes was made on basis of clinical evaluation, biochemical tests like fasting plasma glucose, post prandial plasma glucose and HBA1C according to ADA guidelines.

Exclusion Criteria

Already diagnosed T2DM

Patients having cardiovascular diseases like valvular heart disease, ischemic heart disease, hypertensive heart disease, congestive heart failure and cardiomyopathy.

COPD

Severe Anemia

Haemoglobinopathies

Renal Failure.

Results

Age group (Yr)	TOTAL		MALE		FEMALE		LVDD	
	No.	%	No.	%	No.	%	No.	%
30-39	6	12	4	8	2	4	2	4
40-49	16	32	11	22	5	10	6	12
50-60	28	56	20	40	8	16	19	38
Total	50	100	35	70	15	30	27	54

Table 1

Table 1 shows the distribution of our patients according to age, gender and presence of LVDD. It clearly indicates the highest percentage of LVDD cases among the age group of 50-60 years. Males were more affected than females.

PARAMETERS	WITH LVDD	WITHOUT LVDD	P VALUE
No. Of patients	27	23	N/A
Age(year)	50.48±4.5	45.32±4.5	0.0002
BMI (kg/m2)	25.72 ± 1.6	23.81 ± 1.96	0.0004
Fasting Blood Sugar	186 ± 20.91	169 ± 19.87	0.0052
Hba1C (%)	8.6 ± 0.6	7.2 ± 0.4	<0.0001

Table 2

Table 2 shows the corelation of patients among the groups of LVDD and non LVDD and their association as per BMI , Age, Fasting blood sugar levels and HbA1C. All the parameters came to be significant with a significant p value. We can conclude that the as the blood sugar levels and HbA1C rises, the prevalence of LVDD also increases thereby causing a increased risk of Heart failure with preserved ejection fraction.

Discussion

In our study we assessed incidence of LVDD and it's correlation with HBA1c and other parameter like BMI in 50 newly diagnosed normotensive type 2 diabetic patients between ages of 30-60 yrs.

LVDD was found in 54% of patients in this study via echocardiography and no case of systolic dysfunction was found.[4]

Diastolic dysfunction in diabetic patients is believed to represent an earlier stage in the natural history of diabetic cardiomyopathy and its early recognition helps to avoid or delay the onset of congestive heart failure.[8]

Patil et al.[5], in their study of 127 asymptomatic subjects found the prevalence of diastolic dysfunction in asymptomatic type 2 diabetics as 64.33%

Absence of cases with systolic dysfunction signifies that diastolic dysfunction is the earliest marker of diabetic cardiomyopathy which precedes systolic dysfunction

Mean of HbA1c was found higher in group with LVDD(8.6±0.6) as compared to group without LVDD(7.2±0.4). This concludes that HbA1C is strongly associated with the presence of LVDD ($p<0.0001$- highly significant).

Celentano et al.[6], also studied subjects with normal glucose tolerance, with impaired glucose tolerance, and with type2 DM and found early signs of diastolic dysfunction ,not only in patients with diabetes but also in those with impaired glucose tolerance, independent of body weight and blood pressure(confounding factor).

BMI was found to be correlated with LVDD(p value=0.0004)

Incidence of LVDD was also found higher in patients group specially above 50 yrs of age and its correlation was most significant(p=0.0002),

Holzmann et al.,[7]showed in middle-aged population without previously diagnosed DM a continuous relationship between concentrations of fasting plasma glucose, HbA1c and LVDD.

Conclusion

This study shows that higher HbA1C level (more than 8.6±0.6) is strongly associated with presence of LVDD, considered as precursor of diabetic cardiomyopathy.

HbA1C emerges as an important indicator of diastolic dysfunction in early onset diabetic population in our study.

Age at the time of diagnosis of type 2 DM was predicted as most important risk factor for LVDD in these newly diagnosed patients.

References

1. Yuankai S, Hu Frank B. The global implications of diabetes and cancer. The Lancet. 2014; 383 (9933):1947–48.
2. Anjana RM, et al. ICMR- INDIAB Collaborative Study Group: Prevalence of diabetes and prediabetes in rural and urban India: Phase 1 results of the Indian Council of Medical Research-India DIABetes (INDIAB) study. Diabetologia. 2011;54:3022–27.
3. Kazik A, Wilczek K, Poloski L. Management of diastolic heart failure. Cardiol J. 2010;17:558–65.
4. Zarich SW, Nesto RW. Diabetic cardiomyopathy. Am Heart J. 2001;35:166–68.
5. Patil MB, Burji Nishkal Prabhu A. Echocardiographic Evaluation of Diastolic Dysfunction in Asymptomatic Type 2 Diabetes Mellitus. JAPI. 2012;60:23–26.
6. Holzmann M, Olsson A, Johansson J, Jensen-Urstad M. LV diastolic function is related to glucose in a middle-aged population. J Intern Med. 2002;251:415–20.
7. Patil VC, Patil HV, Shah KB, Vasani JD, Shetty P. Diastolic function in asymptomatic type 2 diabetes mellitus with normal systolic function. J Cardiovascular Dis Res. 2011;2(4):213–22.
8. Sujino T, Kawasaki D, Bonow RO. New insights into diastolic heart Failure. role of diabetes mellitus. Am J Med. 2005;116(suppl6):34S–45S.