

CLINICAL PROFILE AND ECHOCARDIOGRAPHIC CHANGES IN PATIENTS WITH NEWLY DIAGNOSED TYPE 2 DIABETES

Niraj Kumar Jaiswal,¹ Manoj Karki,¹ Pushpa Raj Dhakal,¹ Manish Dahal,¹ Sanjog Kandel,¹ Aakash Shahi,¹ Shatdal Chaudhary¹

ABSTRACT

INTRODUCTION

The burden of type 2 diabetes is increasing in world and same is scenario in Nepal. The prevalence of T2DM in Nepal has increased from 2014 to 2020. T2DM is still a major cause of worldwide morbidity and mortality, due to its complications. A strong correlation between cardiovascular diseases and diabetes mellitus type 2 (DM) has been found. This study aimed to investigate echocardiographic features and clinical profile in patients with newly diagnosed T2DM.

MATERIAL AND METHODS

Our study included 100 patients with newly diagnosed type 2 diabetes, presented to Medicine Department of Universal College of Medical Sciences Teaching Hospital, Bhairahawa from 1st May, 2019 AD to 30th April 2020. We included type 2 diabetes diagnosed as per American diabetes association 2018 criteria.

RESULTS

Males (52%) were more compared to females (44%). 28% were in age group 61-70 years, 26% in age group 41-50 years and 25% in age group 51-60 years. Abnormal thirst 42%, polyuria 38% and weight loss 32% were most common presenting symptoms with 23% having all 3 symptoms. Fifty two percent were smokers, 22% consumed alcohol, 48% had HTN and 23% cases had CAD. Forty two cases (42%) had Left ventricular diastolic dysfunction, 25 cases (25%) had Left ventricular hypertrophy (LVH), 16 cases (16%) had RWMA others had RA/RV dilated and dilated LV/LA.

CONCLUSION

LVDD was most common echocardiographic finding in newly diagnosed type 2 diabetes.

KEYWORDS

Type 2 diabetes, Echocardiography, Left ventricular diastolic dysfunction.

1. Department of Internal Medicine, Universal College of Medical Sciences, Bhairahawa, Nepal.

<https://doi.org/10.3126/jucms.v10i02.51252>

For Correspondence

Dr. Niraj Kumar Jaiswal
Department of Internal Medicine
Universal College of Medical Sciences
Bhairahawa, Nepal
Email: nirajkrjaiswal@hotmail.com

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is an endocrine disorder characterized by hyperglycemia resulting from variable degrees of insulin resistance and deficiency.¹ In Nepal in 2017, almost 10,000 individuals died due to T2DM or diabetes-related complications. This is the 11th most common cause of disability in terms of disability-adjusted life years.² T2DM is still a major cause of worldwide morbidity and mortality, due to complications such as neuropathy, nephropathy, stroke, and coronary artery disease.³ The prevalence of T2DM in Nepal has increased from 2014 (8.4%) to 2020 (8.5%).^{4,5} A strong correlation between cardiovascular diseases and diabetes mellitus type 2 (DM) has been found. Adults with DM are two to four times more likely to have heart disease than adults without diabetes.⁶ Whether T2DM is independently associated with structural heart abnormalities is controversial because of confounders (hypertension, abnormal lipid level, obesity and lack of physical activity) associated with T2DM.⁷ Diastolic dysfunction, left ventricular hypertrophy and left atrial enlargement were most commonly found in echocardiography of diabetic patients and neither cardiac symptoms nor clinical characteristics were effective to identify these patients.⁸

This study aimed to investigate echocardiographic features and clinical profile in patients with newly diagnosed T2DM.

MATERIAL AND METHODS

It was a cross-sectional study conducted in Universal College of Medical Sciences, Bhairahawa from 1st May, 2019 AD to 30th April 2020 AD. Ethical clearance for the research was taken from Institutional Review Committee, UCMS. The study included all patients presenting to Medicine department with newly diagnosed type 2 diabetes and aged greater than 30 years. A total of 100 patients were included in this study. As per the case file, the diagnosis of type 2 diabetes depended on criteria given by ADA 2018.¹ Data regarding patient gender, age, symptoms and comorbidities were taken. Echocardiography was done and its findings were collected. The data was analyzed using Statistical Package for the Social Sciences (SPSS)²⁰.

RESULTS

Out of 100 cases of newly diagnosed type 2 diabetes 52% were males and 48% were females.

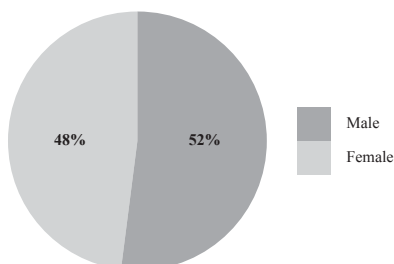


Figure 1. Sex distribution of newly diagnosed diabetes

Out of 100 cases, 6 cases (6%) of newly diagnosed type 2 diabetes were in age group 31-40 years, 26 cases (26%) were in age group 41-50 years, 25 cases (25%) were in age group 51-60 years, 28 cases (28%) were in age group 61-70 years, 11 cases (11%) were in age group 71-80 years and 4 cases (4%) were above 81 years.

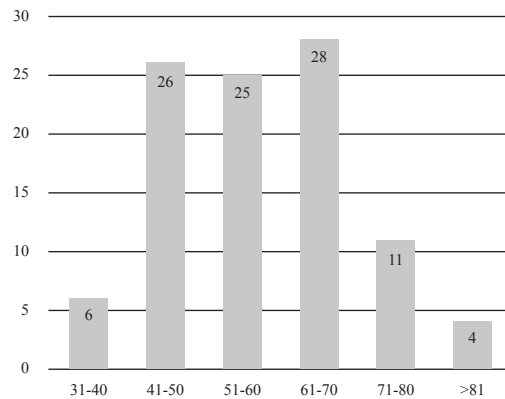


Figure 2. Age distribution of newly diagnosed diabetes

Out of 100 cases, 42 cases (42%) of newly diagnosed type 2 diabetes presented with abnormal thirst, 38 (38%) presented with polyuria, 32 (32%) presented with weight loss, 14 (14%) presented with claudication, 12 (12%) presented with fatigue, 11 (11%) presented with chest discomfort, 10 (10%) presented with shortness of breath on exertion and 10 (10%) presented with decreased vision. Twenty three cases (23%) had all 3 symptoms of abnormal thirst, polyuria and weight loss.

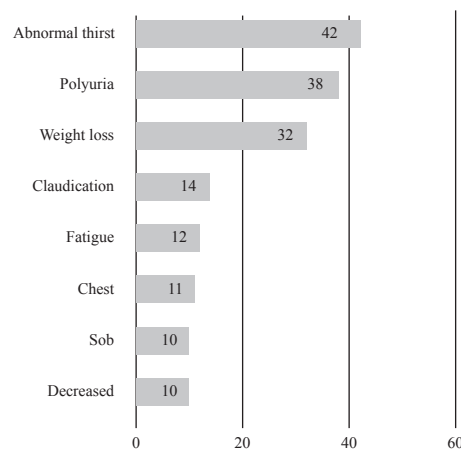


Figure 3. Symptoms at presentation of newly diagnosed diabetes

Out of 100 cases of newly diagnosed type 2 diabetes, 52 cases (52%) were smokers and 48 (48%) were non smokers, 22 (22%) consumed alcohol and 78 (78%) didn't consume alcohol.

Table 1. Patient characteristics

Smoking	Yes	52	52%
	No	48	48%
Alcohol	Yes	22	22%
	No	78	78%

Out of 100 cases of newly diagnosed type 2 diabetes, 48 cases (48%) had HTN and 52 (52%) had normal BP, 23 (23%) had CAD and 77 (77%) did not have CAD.

Table 2. Distribution of comorbidity

HTN	Yes	48
	No	23
CAD	Yes	23
	No	77

Out of 100 newly diagnosed type 2 diabetes, 42 cases (42%) had left ventricular diastolic dysfunction, 25 cases (25%) had left ventricular hypertrophy (LVH), 16 cases (16%) had RWMA, 9 cases (9%) had RA/RV dilated, 5 cases (5%) had dilated LV and 3 cases (3%) had dilated LA.

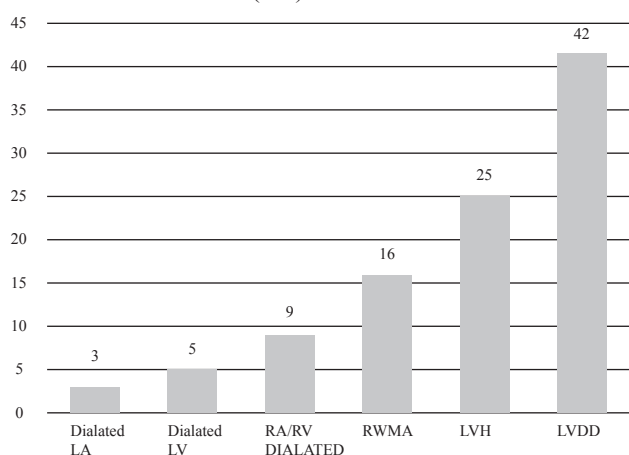


Figure 4. Echo characteristics of newly diagnosed type 2 diabetes

DISCUSSION

In our study, 52% were males and 48% were females among 100 case of newly diagnosed type 2 diabetes. More males were found to have newly diagnosed type 2 diabetes compared to females.⁹ Similar finding was found in another study conducted in Nepal, which identified being female as significant protective factor for DM (AOR 0.4, 95% CI 0.3 to 0.7).¹⁰ A systematic review done in South Asia also supported the findings from our study, indicating being male as a significant risk factor for DM.¹¹ Higher prevalence of DM among men has been associated with large amount of visceral fat in men.¹²

In this study, 79 cases (79%) were between ages of 40 and 70 years. The prevalence of type 2 DM was high in age group 40-50 years and 60+ years compared to below 30 years.⁽⁹⁾ In a study done in Nepal the median age (\pm SD) of the study group was 47.37 (\pm 9.95) years. Maximum number (31%) of the study participants were in the age group 45-54 years.¹⁰ The importance of age as a risk factor is consistent with another study done in Bangladesh.¹³

In our study, abnormal thirst 42%, polyuria 38% and weight loss 32% was most common presenting symptoms with 23% having all 3 symptoms. Frequent urination was reported by every patient assessed during the study period followed by frequent drinking/thirst (79%), general body weakness

(51%), blurred vision (38%), frequent eating (33%), excessive sweating (27%), joint pains (22%), numbness (21%) and headache (21%).¹⁴ Thirst, polyuria, weight loss, skin infections and lethargy were significantly associated with diabetes.¹⁵

In our study, 52 case (52%) were smokers and 48 cases (48%) were non-smokers. Random-effects meta-analysis of four T2DM studies showed that the differences in T2DM status among smokers and non-smoker was not significant (OR, 0.752; 95% CI, 0.366-1.546; I² ; 87.2%).¹⁶

In our study, 22 case (22%) consumed alcohol and 78 cases (78%) didn't consume alcohol. Random-effects model showed that T2DM status among alcoholic and non-alcoholic groups were not statistically significant.¹⁶ It was further supported by a study done by Kushwaha and Kandel in Nepal.¹⁷

In this study, 48 cases (48%) had HTN and 52 cases (52%) had normal. Half of the recently diagnosed Type 2 Diabetes were hypertensive. Hypertension was more common in overt proteinuric diabetes than person with microalbuminuria and nonalbuminuria.¹⁸ The prevalence of hypertension in newly diagnosed type 2 diabetes was 61.9% (95% CI: 54.8-68.6%).¹⁹ Meta-analysis of three studies that have studied on T2DM status and its relation with BP has concluded that the odds of individuals with normal BP having T2DM is 62% lower than those with high BP.¹⁴

In this study, 23 cases (23%) had CAD and 77 (77%) did not have CAD. Newly diagnosed Indian T2DM patients are at high ASCVD risk. They had an average CVD risk of $15.3 \pm 12.3\%$.²⁰ Our study showed 42 cases (42%) had Left ventricular diastolic dysfunction, 25 (25%) had Left ventricular hypertrophy (LVH), 16 (16%) had RWMA others had RA/RV dilated, dilated LV and dilated LA the prevalence of an echocardiogram abnormality among newly diagnosed diabetic patients was high at 67.8% with diastolic dysfunction as the main abnormality. Other findings were left ventricular hypertrophy, systolic dysfunction and regional wall abnormalities. Diastolic dysfunction, systolic dysfunction, LVH and wall motion abnormalities were present in 55.0%, 21.8%, 19.3% and 4.0% respectively of all the participants with mean duration of diabetes of 2 months.²⁰ In a study done in India, incidence of LVDD was 41%. Grade 1 LVDD was most common. Mean HbA1C level was higher in group with LVDD as compared to group without LVDD.²¹ Prevalence of diastolic dysfunction was found to be 44.4% in patients of type 2 diabetes mellitus without cardiac manifestations.²²

CONCLUSION

Male sex and age over 40 years were at increased risk of type 2 diabetes. Abnormal thirst, polyuria and weight loss were most common presenting feature of newly diagnosed type 2 diabetes. HTN and coronary artery disease were associated comorbidities. LVDD was most common echocardiographic finding in newly diagnosed type 2 diabetes.

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