

ECHOCARDIOGRAPHY FINDINGS IN A COHORT OF ELDERLY DIABETIC PATIENTS WITH DIASTOLIC DYSFUNCTION: DO THEY FALL UNDER THE DIABETIC CARDIOMYOPATHY DIAGNOSIS?

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Abstract

Objectives: Our main goal is to describe the echocardiography findings in older type 2 diabetic patients with diastolic dysfunction (DD) and contrast them with the diabetic cardiomyopathy criteria.

Methods: We assessed 201 echocardiography results in a private cardiology center in Guayaquil, Ecuador. We describe the mean±SD of continuous variables, and frequencies of categorical variables with cut-off points taken from the Spanish Society of Cardiac Imaging guidelines. We conducted Chi-square and linear regression analysis for further associations.

Results: The mean age was 68.07±12.08, 75.6% were females, 92.5% had hypertension (HTN) and 79.1% had DD with a mean ejection fraction of 64.51±9.44. The mean interventricular septum width (IVSW) was 11.05±2.66mm. HTN showed no association with DD (**p=0.929**), however, an increased IVSW (**p=0.47**) and age >65yo (**p<0.001**) did. IVSW also showed a strong positive correlation with posterior wall width (PWW) (B=0.872, **p<0.001**), although PWW mean was normal (10.48±2.22mm).

Conclusion: These diabetic patients had **DD which was not related with HTN** but associated with age and increased IVSW. Diabetic cardiomyopathy (DCM) is defined as diastolic or systolic dysfunction in the absence of cardiovascular disease (CVD), therefore we couldn't classify them into this category because the majority had HTN. However, we found no association between DD and HTN.

Introduction

- Cardiovascular disease (CVD) is the main cause of mortality worldwide¹. 1 out of 5 elderly adults are diabetic and 32% of diabetics have CVD, which is the main cause of mortality^{2,3}.
- Diastolic dysfunction (DD) can be present in up to 64% of type-2 diabetics^{4,5}. Hypertension (HTN) has shown to be present up to 85% of diabetics with myocardial dysfunction⁶.
- A frequent, but discretely recognized complication is diabetic cardiomyopathy (DCM) and has an unspecific prevalence between 30-75%⁷⁻⁹. It is defined as a **diastolic or systolic dysfunction in the absence of CVD**^{10,11}.

Results

Table 1. Demographics and echocardiographic findings of 201 patients.

Variables	N=201
Age	68.07±12.08
Female	152 (75.6)
HTN	186 (92.5)
Dyslipidemia	138 (68.7)
Elevated BMI >24.9	171 (85.1)
Diastolic dysfunction (DD)	159 (79.1)
Systolic dysfunction (SD)	19 (9.5)
LVH	117 (58.2)
IVSW (mm)	11.05±2.66

HTN = hypertension, LVH = left ventricle hypertrophy, BMI = body mass index, IVSW = interventricular septum width

Table 2. Diastolic dysfunction analysis.

Variables	Pearson Chi-square	p value
Age >65 yo	12.890	< 0.001
HTN	0.008	0.929
Increased IVSW	3.960	0.047

HTN = hypertension, IVSW = interventricular septum width.

Discussion

- In this study we looked for associations between DD and age, BMI, smoking history, HTN and IVSW. We found association between DD and age >65yo, and DD with IVSW.
- Our patients do not fall under DCM criteria due to HTN predominance, even though DD was not associated with HTN.
- We wish to pose the question: Is necessary to exclude CVD from DCM criteria?. We call for further investigation.

Summary

In our sample we found DD in type-2 diabetic patients, however we couldn't classify them as DCM because of the presence of HTN. On further analysis we found no association between DD and HTN, which raises the doubt for future research about whether CVD (e.g., HTN) needs to be excluded or not for the diagnosis of DCM.

Conclusions

- These elderly diabetic patients had DD, which was associated with age and increased IVSW.
- As DCM concept implies **exclusion of CVD**, we couldn't classify them into this category because most had HTN.
- However, we found **no association between DD and HTN**, which raises the doubt for future research about whether CVD (eg, HTN) needs to be excluded or not from the diagnosis of DCM.

References

- Cardiovascular diseases [Internet]. Available from: <https://www.who.int/health-topics/cardiovascular-diseases>
- IDF Diabetes Atlas 9th edition 2019 [Internet]. Available from: <https://www.diabetesatlas.org/en/>
- Cavallari I, et al. Causes and Risk Factors for Death in Diabetes: A Competing-Risk Analysis From the SAVOR-TIMI 53 Trial. J Am Coll Cardiol. 2021 Apr 13;77(14):1837-40.
- Yadava SK. Prevalence of Diastolic Dysfunction in Type 2 Diabetes Mellitus. Kathmandu Univ Med J KUMJ. 2017 Sep;15(59):212-6.
- Patil MB. Echocardiographic evaluation of diastolic dysfunction in asymptomatic type 2 diabetes mellitus. J Assoc Physicians India. 2012 May;60:23-6.
- Ramírez Pulúa DA. Miocardiopatía diabética en paciente entre 30- 70 años en el Hospital Luis Vernaza Sala San Antonio, año 2015. 2016. Available from: <http://repositorio.ug.edu.ec/handle/redug/18765>
- Zabalgotia M. Prevalence of diastolic dysfunction in normotensive, asymptomatic patients with well-controlled type 2 diabetes mellitus. Am J Cardiol. 2001 Feb 1;87(3):320-3.
- Poirier P. Diastolic dysfunction in normotensive men with well-controlled type 2 diabetes. Diabetes Care. 2001 Jan;24(1):5-10.
- Boyer JK. Prevalence of ventricular diastolic dysfunction in asymptomatic, normotensive patients with diabetes mellitus. Am J Cardiol. 2004 Apr 1;93(7):870-5.
- American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013 Oct 15;62(16):e147-239.
- European Society of Cardiology (ESC) in collaboration with the European Association for the Study of Diabetes (EASD). Eur Heart J. 2013 Oct;34(39):3035-87.