



Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en



CLINICAL RESEARCH

Layer-specific deformation of the left ventricle in uncomplicated patients with type 2 diabetes and arterial hypertension

Déformation myocardique ventriculaire gauche chez les diabétiques de type II hypertendus

Marijana Tadic^{a,b,*}, Cesare Cuspidi^c,
Vladan Vukomanovic^a, Sanja Ilic^d, Philippe Obert^e,
Vesna Kocijancic^a, Vera Celic^{a,b}

^a Department of Cardiology, University Hospital "Dr Dragisa Misovic-Dedinje", Belgrade, Serbia

^b Faculty of Medicine, University of Belgrade, Belgrade, Serbia

^c Clinical Research Unit, University of Milan-Bicocca and Istituto Auxologico Italiano, Meda, Italy

^d Department of Endocrinology, University Hospital "Dr Dragisa Misovic-Dedinje", Belgrade, Serbia

^e LAPEC EA4278, School of Exercise Science, Avignon University, Avignon, France

Received 12 November 2016; received in revised form 14 December 2016; accepted 25 January 2017

KEYWORDS

Diabetes;
Hypertension;
Left ventricle;
Multilayer strain;
Two-dimensional speckle tracking

Summary

Background. – Detailed analysis of layer-specific mechanical changes in patients with type 2 diabetes mellitus (DM) might improve insight into left ventricular (LV) remodelling and diabetic cardiomyopathy.

Aim. – We sought to investigate layer-specific LV deformation in patients with DM, with and without hypertension.

Abbreviations: 2DE, two-dimensional echocardiography; BMI, body mass index; DM, type 2 diabetes mellitus; HbA1c, glycated haemoglobin; LV, left ventricle/ventricular.

* Corresponding author. University Hospital "Dr Dragisa Misovic-Dedinje", Heroja Milana Tepica 1, 11000 Belgrade, Serbia.

E-mail address: marijana.tadic@hotmail.com (M. Tadic).

<http://dx.doi.org/10.1016/j.acvd.2017.01.014>

1875-2136/© 2017 Elsevier Masson SAS. All rights reserved.

Please cite this article in press as: Tadic M, et al. Layer-specific deformation of the left ventricle in uncomplicated patients with type 2 diabetes and arterial hypertension. Arch Cardiovasc Dis (2017), <http://dx.doi.org/10.1016/j.acvd.2017.01.014>

Methods. – This cross-sectional study included 146 subjects (44 controls; 48 patients with DM; 54 patients with DM and hypertension) who underwent complete examination by two-dimensional echocardiography (2DE), including multilayer strain analysis.

Results. – 2DE LV longitudinal and circumferential strains deteriorated progressively and significantly from controls, through patients with DM, to patients with DM and hypertension. 2DE radial strain was lower in patients with DM and hypertension than in controls. 2DE longitudinal and circumferential mid-myocardial and epicardial layer strains decreased progressively from controls to patients with DM and hypertension, whereas endocardial layer strain was lower in patients with DM and patients with DM and hypertension than in controls. Variables of DM control (fasting glucose and glycated haemoglobin) were associated with 2DE LV longitudinal and circumferential layer-specific strains, independent of age, body mass index, blood pressure, LV diastolic function and hypertrophy in patients with DM.

Conclusion. – DM and hypertension significantly affect LV deformation assessed by 2DE traditional strain and 2DE multilayer strain. Hypertension showed an additional negative effect on LV deformation in patients with DM. Fasting glucose and glycated haemoglobin were associated with LV mechanics evaluated by comprehensive 2DE strain analysis, independent of LV structure and diastolic function.

© 2017 Elsevier Masson SAS. All rights reserved.

MOTS CLÉS

Diabète ;
Hypertension
artérielle ;
Ventricule gauche ;
Imagerie de
déformation
multicouche ;
Échographie de
Speckle

Résumé

Objectif. – Nous avons investigué l'imagerie de déformation ventriculaire gauche multicouche chez des sujets normotendus et hypertendus ayant un diabète de type II.

Méthode. – Cette étude transversale a inclus 146 sujets, 44 témoins, 48 diabétiques normotendus, 54 diabétiques hypertendus qui ont bénéficié d'un examen échographique complet incluant l'imagerie de déformation multicouche à l'aide de la technique de l'échographie de Speckle.

Résultats. – Le *strain* ventriculaire gauche longitudinal et circonférentiel s'altère de façon progressive et significative chez les patients ayant un diabète, qu'il y ait ou non une hypertension artérielle. L'imagerie de déformation (*strain* radial) est plus faible chez les diabétiques hypertendus comparativement aux témoins. Le *strain* longitudinal et circonférentiel des couches moyenne et épicaudique s'altère de façon progressive chez les diabétiques hypertendus comparativement aux témoins, tandis que le *strain* endocardique est plus faible chez les patients diabétiques normotendus ou hypertendus comparativement aux témoins. Les paramètres attestant du contrôle du diabète (glycémie à jeun, hémoglobine glyquée) sont associés avec le *strain* multicouche longitudinal et circonférentiel, indépendamment de l'âge, de l'indice de masse corporelle, de la pression artérielle, de la fonction diastolique ventriculaire gauche et de la présence d'une hypertrophie ventriculaire gauche chez les patients diabétiques.

Conclusion. – Diabète et hypertension artérielle altèrent de façon significative les paramètres de déformation ventriculaire gauche, évalués à l'aide de la technique d'échographie de Speckle multicouche. L'hypertension artérielle a un effet additif négatif sur les paramètres de déformation ventriculaire gauche chez les patients diabétiques. La glycémie et l'hémoglobine glyquée sont associées avec les paramètres de dysfonction mécanique ventriculaire gauche appréciés par l'imagerie de déformation, indépendamment des modifications structurelles ou de l'altération de la fonction diastolique ventriculaire gauche.

© 2017 Elsevier Masson SAS. Tous droits réservés.

Background

Type 2 diabetes mellitus (DM) is known to be an important contributing risk factor for cardiovascular disease development, particularly heart failure, even in the absence of arterial hypertension, obesity and coronary heart disease [1]. The main feature responsible for increased cardiovascular risk in patients with DM is diabetic cardiomyopathy [2]. Pre-

viously, left ventricular (LV) diastolic dysfunction was identified as the earliest functional alteration in the course of diabetic cardiomyopathy [3,4]. However, modern echocardiographic techniques enable detection of subtle changes in systolic function in patients with DM with preserved ejection fraction and normal LV diastolic function [5–7].

A recent study showed that in patients with DM, LV global longitudinal strain was independently associated with

Download English Version:

<https://daneshyari.com/en/article/8653693>

Download Persian Version:

<https://daneshyari.com/article/8653693>

[Daneshyari.com](https://daneshyari.com)