The effect of DPP-4 inhibitors therapy on the left atrial volume index in patients with type 2 diabetes mellitus

The left atrial volume index (LAVI) is part of cardiac remodeling in a variety of cardiovascular diseases and a strong predictor of cardiovascular morbidity and mortality. The aim of the present study was to estimate the effect of dipeptidyl-peptidase-4 inhibitors (DPP-4i) on LAVI in patients with type 2 diabetes mellitus (T2D).

Study was made of 95 patients with T2D but without known cardiovascular disease (55 males), mean age (±standard deviation) 65.1±9.1 years, HbA1c 6.4±0.8%, body-mass index (BMI) 29.21±5.4 kg/m², duration of diabetes 8.1±4.9 years. The patients were receiving either metformin monotherapy (40 patients, group A) or metformin plus DPP-4i (55 patients, group B) for at least 6 months. All the study patients underwent full clinical examination and ultrasound (US) examination of the heart, and a fasting venous blood sample was taken. Of the study participants, 63.8% had arterial hypertension, 78.9% dyslipidemia, 10.6% retinopathy and 17.0% neuropathy, and 13.7% were smokers. The patients were divided according to risk, with the criterion LAVI ≥32 mL/m².

LAVI ≥32 mL/m² was found in 14 patients (17.3%). The mean LAVI did not differ between the two study groups (group A: 25.1±6.0 mL/m² vs group B: 25.9±7.1 mL/m²; p=0.58). Multivariate regression analysis, controlling for age, sex, BMI, duration of T2D, HbA1c, smoking, neuropathy, retinopathy, DPP-4i and metformin therapy, C-reactive protein, creatinine clearance, uric acid, low density lipoprotein- and high density lipoprotein-cholesterol, showed that LAVI was positively associated with hypertension (beta=0.39, p=0.008), white blood cell count (beta=0.262, p=0.09), and serum triglyceride level (beta=0.42, p=0.07). No significant association was demonstrated between LAVI and DPP-4i therapy.

The results of this study showed that treatment with DPP-4i has a neutral effect on LAVI. Despite a growing body of evidence, it still remains unclear whether DPP-4i improves left ventricle (LV) diastolic function in patients with T2D, and, if so, whether the effect is attributable to the attenuation of postprandial hyperglycemia or to a direct cardiac effect of DPP-4i. Using heart failure-model rats, dos Santos and colleagues reported that sitagliptin administered for 6 weeks produced a significant improvement in cardiac contraction and reduction in LV end-diastolic pressure and chamber stiffness.

Hypertension, higher white blood cell count and triglyceride level were the only determinants of LAVI in the present study. In a recent study, diabetic microvascular complications were shown to be associated with increased LAVI in patients with well-controlled T2D who had preserved systolic function and were free from ischemic heart disease, independently of multiple potential confounders. It has also been shown that excess visceral fat accompanied by adipocyte dysfunction might play a greater role than glycemic control in the development of diastolic dysfunction and LV hypertrophy in T2D. Finally, the Hoorn study showed that glucose status and arterial distensibility were independently associated with more severe LV diastolic dysfunction and with deterioration of LV diastolic dysfunction.

In conclusion, the results of the present study show that treatment with DDP-4 inhibitors has a neutral effect on LAVI. Further studies are needed to explain the role of DPP-4i in cardiac remodeling.

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Επίδραση της θεραπείας με αναστολείς DPP-4 στον δείκτη όγκου του αριστερού κόλπου σε ασθενείς με σακχαρώδη διαβήτη τύπου 2

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