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**Subclinical left ventricular dysfunction in patients with insulin resistance and hypovitaminosis D**

Stevanovic A.<sup>1</sup>; Dekleva M.<sup>2</sup>; Ilic Pasquali N.<sup>1</sup>

<sup>1</sup>General Hospital Euromedik, Belgrade, Serbia

<sup>2</sup>University Clinical Center Zvezdara, Department of Cardiology, Belgrade, Serbia

**Introduction:** Patients with subclinical left ventricular diastolic and systolic dysfunction are at risk of future cardiac events.

Insulin resistance (IR) has been reported to be a strong risk factor for cardiovascular disease (CVD). Hypovitaminosis D is associated with insulin resistance and beta cell dysfunction and vitamin D deficiency is also associated with increased risk of CVD, including hypertension, heart failure, and ischemic heart disease.

**Aim:** The aim has been to explore association of IR and vitamin D deficiency with subclinical left ventricular dysfunction.

**Method:** The study consisted of 79 patients divided into two groups according IR, evaluated at baseline by the homeostasis model assessment method (HOMA-IR). The HOMA1-IR index was calculated by the formula:  $HOMA1-IR = \text{fasting plasma insulin } (\mu\text{U/ml}) \times \text{fasting plasma glucose (mmol/L)}$ . The HOMA2-IR index was obtained by the program HOMA Calculator (free) download Windows version.

The cut-off values for IR were:  $HOMA1-IR > 2.7$  and  $HOMA2-IR > 1.8$ ; group of 41 patients, and group of 38 patients without of IR.

Parameters of left atrial and ventricular geometry were estimated by echocardiography. Tissue Doppler velocities were measured from medial and lateral annulus (e, a, s) including isovolumic contraction velocity (IVCv) and E/e Global longitudinal strain (GLS) was derived from two-dimensional speckle-tracking.

**Results:** In IR group level of 25-OH-D was deficient in 25 (61.2%), insufficient in 10 (25%) and sufficient in 6 (13.8%) patients and significantly lower compared to control group ( $46.8 \pm 25.5$  vs  $61.5 \pm 33.8$ ,  $p < 0.001$ ).

Importantly, 25-OH-D was associated with global longitudinal strain ( $r = -0.21$ ,  $p < 0.05$ ). Values of GLS ( $-19.9 \pm 2.8$  vs  $-26.6 \pm 2.9$ ;  $p < 0.001$ ) and IVCv ( $0.07 \pm 0.02$  m/s vs  $0.09 \pm 0.03$  m/s;  $p < 0.05$ ) were significantly lower and E/e ( $9.11 \pm 2.24$  vs  $7.18 \pm 1.65$ ;  $p < 0.001$ ) significantly higher in group of patients with IR.

**Conclusion:** The results showed that insulin resistance is associated with subclinical LV diastolic and systolic dysfunction. Level of 25-OH-D was significantly lower in patients with insulin resistance suggests that vitamin D deficiency may have a certain contribution to the development of myocardial dysfunction in these patients.

Fortunately insulin resistance and vitamin D deficiency are a modifiable risk factors; the reduction of insulin resistance and increase the level of 25-OH-D may reduce CV risk in this group of patients.