

## Summary

Patients with type 2 diabetes mellitus (DM) suffer often from cardiorenal syndrome because of high prevalence of cardiac and renal insufficiency. Functional deterioration of both organs depends on the compensation of DM, arterial hypertension and other metabolic parameters. We asked a question when did the cardiorenal interaction develop and which factors influenced its development. We examined 82 patients with type 2 DM with optimally corrected arterial hypertension, with well compensated diabetic metabolic disorder, without any clinical signs of heart disease and with normal or mild-to-moderate decrease in glomerular filtration rate according to MDRD equation (eGFR).

We analysed the associations between eGFR and echocardiographic parameters of left ventricular (LV) diastolic function  $E'$  and  $E/E'$  on the basis of linear regression and multivariate analysis. According to multivariate analysis eGFR was significantly associated with  $E'$  and  $E/E'$  either. We assessed the association between  $E'$  and GFR by cluster analysis that divided whole cohort into two subgroups on the basis of the value  $E' = 7.1 \text{ cm s}^{-1}$ . We analysed the associations between the parameters of LV diastolic function, eGFR and other parameters separately in both subgroups. We found out, that cardiorenal interaction (significant association between eGFR and  $E/E'$ ) existed only in subgroup of patients with  $E' \leq 7.1 \text{ cm s}^{-1}$ . This association was influenced only by vasoactive peptides (NT-proBNP and adrenomedullin).

We suggest that calculated value  $E' = 7.1 \text{ cm s}^{-1}$  represents critical worsening of LV myocardial relaxation in that cardiorenal interaction develops with high validity (97,5% sensitivity and 97,1% specificity according to ROC analysis). Considering our findings we suggest that cardiorenal interaction develops early and that significant changes in the associations between glomerular filtration (GFR) and hemodynamic parameters with contribution of vasoactive peptides develop earlier than the clinical manifestation of cardiorenal syndrome appears.

**Key words:** cardiorenal syndrome, diastolic function, glomerular filtration, type 2 diabetes mellitus, echocardiography, tissue Doppler imaging, natriuretic peptides, N-terminal fragment of B type natriuretic propeptid, adrenomedullin, calcitonin gene-related peptid