The aim of the study was to evaluate the role of such biomarkers as N-terminal prohormone of brain natriuretic peptide (NT-proBNP), cystatin C, and galectin-3 for prediction of poor outcomes of chronic heart failure with preserved ejection fraction (HFpEF) of the left ventricle (LV) in patients with type 2 diabetes mellitus (T2DM) and chronic kidney disease (CKD) with a history of COVID-19.

Methods. This study included 135 patients with HfpEF and cardiovascular disorders, T2DM, CKD, and a history of COVID-19 from more than 3 months prior to enrollment. Patients were assessed clinically, instrumentally and using laboratory methods, including NT-proBNP, cystatin C, and galectin-3 assays and echocardiography. The occurrence of heart failure (HF) decompensation and cardiovascular death (CVD) was recorded over 18 months.

Results. A multivariate regression analysis was used to build a basic model for estimation of probability of HF decompensation and CVD in patients with a history of COVID-19, HFpEF, T2DM, and CKD and included risk factors, such as rating scale of clinical state (ShOKS), stroke volume, left ventricular mass index, E/e' ratio, and NT-proBNP, which showed a high prognostic potential (AUC=0.856; 95% CI: 0.717-0.994; $p<0.001$, sensitivity 85.6%, specificity 79.2 %). Adding cystatin C and galectin-3 improved prognostic properties of the resulting models (AUC=0.867; 95% CI: 0.808-0.923, $p<0.001$, sensitivity 86.3%, specificity 75% and AUC=0.866; 95% CI: 0.809-0.923, $p<0.001$, sensitivity 84.9%, specificity 83.3%, respectively). The best model was developed using levels of assessed biomarkers (AUC=0.879; 95 % CI: 0.845-0.913, $p<0.001$, sensitivity 87.5 %, specificity 88.8 %).

Conclusion. Including NT-proBNP, cystatin C, and galectin-3 into a multifactorial model can improve the prediction of HF worsening and CVD in patients with a history of COVID-19, HFpEF, T2DM, and CKD.