USE OF SGLT2 INHIBITORS IN PATIENTS WITH PREDIABETES AND CHRONIC HEART FAILURE: A CLINICAL AND FUNCTIONAL ASSESSMENT

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Abstract. *Prediabetes negatively influences heart failure progression even before the onset of overt diabetes. This study evaluated the clinical and functional impact of SGLT2 inhibitors in patients with chronic heart failure (CHF) and prediabetes compared with CHF patients with normal glucose metabolism. Forty patients were examined: 20 with CHF and prediabetes (main group) and 20 with CHF without carbohydrate metabolism disorders (control). Over 12 weeks, patients in the main group received SGLT2 inhibitors in addition to standard therapy. The treatment led to improved metabolic indicators, better exercise tolerance, and more favorable echocardiographic changes compared with controls. The findings support the potential value of SGLT2 inhibitors in CHF patients at the prediabetic stage.*

Keywords: *SGLT2 inhibitors; prediabetes; chronic heart failure; glucose metabolism; functional capacity; echocardiography; 6-minute walk test; NYHA class; cardiometabolic therapy.*

Introduction. Prediabetes is characterized by impaired fasting glucose and/or mildly elevated HbA1c, reflecting early metabolic imbalance that enhances cardiovascular risk. In chronic heart failure, even subtle abnormalities in glucose metabolism contribute to endothelial dysfunction, increased oxidative stress, diminished exercise tolerance, and adverse cardiac remodeling.

SGLT2 inhibitors, which initially emerged as glucose-lowering drugs, have demonstrated strong cardiovascular benefits independent of glycemic effects. Their mechanisms include mild osmotic diuresis, reduction of interstitial fluid volume, improvement of myocardial energy utilization, attenuation of systemic inflammation, and improvement of functional capacity.

Given these properties, evaluating their effectiveness at the stage of prediabetes is clinically relevant.

Materials and methods. This study included 40 patients with chronic heart failure (NYHA II–III) treated at the Andijan Branch of the Republican Specialized Scientific-Practical Medical Center of Cardiology. The main group consisted of 20 patients with CHF and confirmed prediabetes (fasting glucose elevation and/or HbA1c 5.7–6.4%).

The control group included 20 CHF patients without any signs of carbohydrate metabolism impairment. All patients received guideline-directed CHF therapy, including beta-blockers, ACE inhibitors/ARBs/ARNI, mineralocorticoid receptor antagonists, and diuretics as indicated.

In addition, patients of the main group received an SGLT2 inhibitor—either dapagliflozin 10 mg/day or empagliflozin 10 mg/day—for 12 weeks. Clinical evaluation was performed at baseline and after 12 weeks of therapy. The assessment included fasting glucose, HbA1c, lipid profile, body weight, blood pressure, and heart rate.

Echocardiographic parameters (left ventricular ejection fraction, LVEDV, LVESV, and indices of diastolic function) were measured. Functional status was evaluated using NYHA classification and the 6-minute walk test (6MWT). All patients were monitored for tolerability and adverse events during follow-up.

Results. By the end of the 12-week period, patients with prediabetes who received SGLT2 inhibitors demonstrated more pronounced improvements compared with CHF patients in the control group. Metabolically, the main group showed a significant reduction in fasting glucose and a modest decrease in HbA1c, indicating stabilization of early carbohydrate metabolism disturbances.

The lipid profile also improved, with a tendency toward lower triglyceride levels and slightly higher HDL levels. Functionally, the main group exhibited a substantial increase in physical endurance.

The average improvement in 6MWT distance reached 38–45 meters, whereas the control group showed only a modest increase of 12–15 meters. A greater proportion of patients in the main group moved to a lower NYHA class, reflecting reduced symptom burden and enhanced daily activity.

Echocardiographic assessment revealed favorable structural and functional cardiac changes among patients receiving SGLT2 inhibitors. A decrease in LVEDV suggested reduced congestion, while improvement in diastolic function parameters indicated better ventricular relaxation.

Left ventricular ejection fraction showed a mild but consistent upward trend in the main group, while remaining largely unchanged in the control group. Overall, SGLT2 inhibitor therapy was well tolerated, with no serious adverse events observed.

The combination of improved metabolic regulation, enhanced exercise tolerance, and beneficial cardiac remodeling emphasizes the relevance of these drugs for CHF patients even before the development of overt diabetes.

Conclusion. In patients with chronic heart failure and prediabetes, the addition of SGLT2 inhibitors to standard therapy leads to marked improvement in metabolic status, functional capacity, and cardiac performance. These benefits exceed those observed in CHF patients without carbohydrate metabolism abnormalities who received only standard therapy.

The results support the early use of SGLT2 inhibitors as part of a comprehensive therapeutic strategy for CHF patients at the prediabetic stage, offering cardiometabolic protection and improved clinical outcomes.

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