0067

Evaluation of the beneficial effect of metformin on clinical indicators of heart failure patients with coronary artery disease and impaired glucose tolerance within a 12-month follow-up

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Abstract

Background. Taking into account evident interrelation between chronic heart failure (CHF) and carbohydrate metabolism disorders (CMD), hyperglycemia correction should also mitigate adverse metabolic effects on the course of CHF, improving the quality of life (QOL) and prognosis. To date, there are several clinical observational and experimental studies on the cardioprotective properties of metformin. No randomized clinical trials currently available.
Purpose. So, the aim of the study is to evaluate baseline and prospective data of ischemic etiology HF FC III (NYHA) patients with prediabetes.
Methods. open label randomized clinical trial in 76 CHF patients with prediabetes was performed. Inclusion criteria: ischemic CHF FC III (NYHA) without CMD and glucose-lowering drugs intake in anamnesis, not older than 65, receiving CHF and CAD basic therapy 3 months prior to inclusion. Exclusion criteria: acute coronary syndrome, acute CHF decompensation, thyroid dysfunction, CKD with eGFR less than 45 ml/min/1,74m2. Clinical examination with collection of complaints, medical history; systolic and diastolic blood pressure (DBP), heart rate (HR), anthropometric indicators (height, weight, BMI, waist circumference) were evaluated. HF FC was assessed by 6-minute walking test results, QOL – by MLHFQ. Laboratory data: fasting and postprandial glucose, HbA1C, lipid profile, creatinine with eGFR, daily proteinuria, serum lactate. Insulin, aldosterone, Nt-proBNP levels determined by ELISA. IR was assessed using HOMA-IR. LV EF was assessed using transthoracic echocardiography. All patients were on lifestyle modification (LSM) and randomized for 2 groups with (n=39) and without (n=37) metformin. Results. In comparison with baseline indicators in metformin group decreasing of BMI (p=0.000), DBP (p=0.005), HR (p=0.000), postprandial glycemia, HbA1C, insulin (IR), aldosterone and Nt-proBNP levels, as well as improvement of kidney function (serum creatinine, eGFR, daily proteinuria) and neurohormonal profile (aldosterone, Nt-proBNP) were revealed after 12 months (p=0.000 in all cases). Moreover, both indicators of QOL (MLHFQ points (p=0.001) and 6-minute walking test results (p=0.000)) and left ventricular ejection fraction were significantly better (p=0.000). In contrast, LSM was associated with significant increasing of fasting glucose and, what`s important, kidney function deterioration. No increasing of lactate was registered in two groups.
Conclusion. Metformin benefits in relation to CHF course become apparent and determine importance and necessity of further large, randomized placebo-controlled trials in HF patients. So, modern therapeutic approaches should be complex and span all pathophysiological links of CHF progression already at the prediabetes stage.

Funding and Conflicts of Interest

No funding
Conflict of interest - none declared