# Possibilities of the Effectiveness of Empagliflozin on Renal Filtration Function in Patients with Ischemic Heart Disease During Percutaneous Coronary Interventions

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**Abstract**

**Background** : Reduction of mortality in patients with cardiovascular pathology and diabetes mellitus (DM), according to recent studies, continues to hold a leading position in the structure of fatal outcomes.
**Aim** The aim of the study was to determine the effect of empagliflozin on glycemia and indicators of renal filtration function in patients with DM and ischemic heart disease (IHD) during transcutaneous coronary interventions (PTCA).
**Methods :** The study included 52 patients with IHD and type 2 DM (57–75 years), who underwent planned coronary interventions. Two groups of patients were presented: Group I (Study Group) – 30 patients who were prescribed empagliflozin 10 mg/day in addition to their previously prescribed antidiabetic therapy, in cases where the glomerular filtration rate was eGFR < 45 ml/min/1.73 m². Group II (Control Group) – 22 patients who continued antidiabetic therapy. The observation period lasted 6 months. Statistical processing was performed using Statistic 10.0
**Results:** Empagliflozin therapy improved glycemic control in the study group. In the control group, statistically significant changes in glycemic control were not observed. During the study period: In the study group, a statistically significant mildly decrease in eGFR was noted initially, followed by stabilization and gradual improvement. In the control group, progression of protein excretion in daily urine was observed (P = 0.011).
**Conclusion:** In patients with type 2 DM and IHD undergoing percutaneous coronary interventions (PTCA), the addition of empagliflozin 10 mg to antidiabetic therapy was associated with: Improvement of glycemic control, Improvement of renal function, a tendency toward improvement of eGFR. **(TCM-GMJ May 2026; 11 (1): P03-P05)**

**Keywords:** Coronary Heart Disease (CHD), Chronic Kidney Disease (CKD), Diabetes Mellitus

## Introduction

Currently, despite existing advances cardiovascular disease maintains a leading position (1) in reducing mortality among patients with type 2 diabetes mellitus (T2DM) (2). In patients with T2DM, diabetic nephropathy represents an equally serious complication, which itself serves as an independent predictive factor for cardiovascular complications and mortality (3,4). Empagliflozin is a sodium-glucose co-transporter 2 inhibitor (SGLT2i) used in T2DM, which has a positive impact on cardiovascular complications and renal outcomes, although the mechanisms remain not fully understood (4,5,6).It is important to study the influence of empagliflozin on renal filtration function in the setting of percutaneous coronary interventions (PTCA), which is a frequent procedure in ischemic heart disease (IHD) for myocardial revascularization. There is limited research on the use of empagliflozin in this patient category (5,6,7,8,9).

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## Methods

The study included 52 patients with IHD and T2DM (aged 57–75), all with chronic kidney disease (CKD) and scheduled for coronary interventions. Patients were divided into two groups :**Group I (Study group)**: 30 patients (15 men and 15 women) who were prescribed em-

pagliflozin 10 mg daily one month prior to coronary intervention and continued for a total of 6 months. **Group II (Control group)**: 22 patients (11 men and 11 women) who continued their standard antidiabetic therapy with glomerular filtration rate eGFR < 45 ml/min/1.73 m². The following parameters were measured: Peripheral blood glucose (hexokinase method), Glycated hemoglobin (HbA1c, enzymatic method), Daily urine protein (colorimetric method), Serum creatinine (Jaffe method), Estimated glomerular filtration rate eGFR.( by CKD-EPI ).Statistical significance was considered at $p = 0.05$.

## Results and discussion

The study was completed by 48 patients (28 in the study group and 19 in the control group). In the study group, 70% of patients had impaired carbohydrate metabolism, in the control group-30% did. Empagliflozin therapy improved glycemic control in 75% of patients. No significant glycemic change occurred in the control group. Baseline blood glucose data in the study group was 13.1 mmol/L, which decreased to 4.1 mmol/L after 6 months ($p = 0.04$)

In the control group, baseline glucose data was 8.45 mmol/L, decreasing to 7.4 mmol/L in 6 months ($p = 0.05$). In the study group was able to improve glycemic control. HbA1c in the study group decreased from 8% to 4% in 6 months ($p = 0.05$).

In the control group, HbA1c decreased from 7% to 6% ($p = 0.19$). Only 11% of the study group did not reach the target glycemic levels. Baseline renal function was evaluated by eGFR. In this regard there was no statistically significant difference between the groups in the initial indicators. One month after PTCA, a slight eGFR decline was observed, followed by stabilization and gradual improvement over the past 6 months, maintaining eGFR 58–60 ml/min/1.73m² ($p = 0.56$). Empagliflozin does not reduce functioning nephrons, which indicates no direct impact on renal morphology (10–16). It is worth noting today Empagliflozin's effects on renal function in non-diabetic nephropathy, though studies remain limited (17). Empagliflozin reduces renal glucose reabsorption, increases urinary glucose excretion without causing hypoglycemia, improves glycemic control, and regulates renal dysfunction via increased filtration rate (18).The **DECLARE** trial, the largest study of T2DM and IHD patients, which revealed slowing down nephropathy progression, driving Forxiga (dapagliflozin) use (19,20).

**DAPA-CKD** showed favorable outcomes in T2DM and non-T2DM patients (21–24). Before Forxiga, there had been no breakthrough therapy in 20 years capable of slowing CKD progression in patients with or without T2DM (25,26). Thus, nephroprotection with empagliflozin is mediated by its hypoglycemic, anti-inflammatory, and pleiotropic effects (25–27).

The **EMPA-REG OUTCOME** trial showed that acute kidney injury occurred in 11% of patients with eGFR < 60 ml/min/1.73m² and 3.2% in those with eGFR > 60 ml/min/1.73m², but patients undergoing PTCA were not included in this trial (24,28).

## Conclusion

Research shows that the effect of empagliflozin in T2DM patients undergoing elective coronary procedures is not well studied. In our study, patients with T2DM, CKD and IHD were included. Coronary interventions present a high risk for kidney injury, as contrast media used during angiography are strong predictors of renal damage. Adding empagliflozin to antidiabetic therapy resulted in a statistically significant HbA1c reduction in 87.3% of patients and achievement of target HbA1c levels. . Administering empagliflozin one month prior to myocardial revascularization serves as an effective compensatory approach in T2DM patients .Data from **EMPA-REG OUTCOME** showed a slowdown in the progression of renal dysfunction with subsequent improvement (4). Research data indicate that SGLT2 inhibitors particularly empagliflozin, initially reduce eGFR, followed by stabilization and eventual improvement (7,8,10). Their use is associated with hypoglycemic and anti-inflammatory effects, regression of renal dysfunction, and improved kidney function (18,20).Empagliflozin 10 mg daily, initiated one month prior to revascularization and continued for 6 months, significantly improves glycemic control, slows renal dysfunction, and promotes eGFR improvement.

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