EVALUATION OF THE EFFECT OF SODIUM–GLUCOSE COTRANSPORTER-2 INHIBITORS IN THE TREATMENT OF CHRONIC KIDNEY DISEASE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Relevance

Type 2 diabetes mellitus (T2DM) is one of the most widespread metabolic diseases worldwide, and one of its most severe complications is chronic kidney disease (CKD). According to various sources, 30–40% of patients with T2DM develop CKD, which significantly increases the risk of mortality and disability. Therefore, identifying new and effective treatment strategies to protect kidney function in patients with diabetes is an urgent priority.

In recent years, sodium–glucose cotransporter-2 (SGLT-2) inhibitors—particularly empagliflozin—have been shown to possess not only hypoglycemic effects but also nephroprotective properties. By inducing glucosuria, they reduce blood glucose levels while simultaneously stabilizing glomerular filtration, decreasing albuminuria, and exerting anti-inflammatory effects that help protect the kidneys.

Objective

To evaluate the effects of empagliflozin on carbohydrate metabolism and kidney function in patients with type 2 diabetes mellitus.

Materials and Methods

The study included 50 patients diagnosed with T2DM (26 men and 24 women, mean age 46.3 ± 4.2 years). The average duration of diabetes was 7.34 ± 2.5 years. Main comorbidities included: diabetic nephropathy (40%), neuropathy (30%), retinopathy (20%), and ischemic heart disease (10%).

All patients were divided into two groups:

- Group 1 (n = 20): received sulfonylureas and biguanides
- Group 2 (n = 30): received empagliflozin (10 mg/day) and biguanides (glucophage, asformin)

Over a 3-month period, the following parameters were evaluated: fasting and postprandial glucose levels, HbA1c, creatinine, urea, glomerular filtration rate (GFR), microalbuminuria (urinary protein), liver enzymes, and ultrasound assessment of kidney status.

Results

In Group 2 (empagliflozin), significant improvements in glycemic parameters were observed:
- Fasting glucose decreased by 23.5% (10.2 ± 2.3 → 7.8 ± 1.2 mmol/L)
- Postprandial glucose decreased by 28.9% (12.8 ± 2.0 → 9.1 ± 1.3 mmol/L)
- HbA1c decreased by 26.6% (9.4 ± 1.7 → 6.9 ± 1.1%) ($p < 0.05$)

In Group 1, the improvements were smaller (7–17%).

Kidney Function:
- In Group 2, GFR increased by 24.1% (61.2 → 76.0%), microalbuminuria decreased by 29.5% (440 → 310 mg/g), creatinine decreased by 1.4%, urea by 4.2%.
- In Group 1, GFR decreased by 2.5%, and microalbuminuria decreased by 24%, but the effect was less pronounced.

No cases of hypoglycemia were recorded in patients taking SGLT-2 inhibitors, whereas several episodes occurred in the sulfonylurea group. No clinically significant changes in liver enzymes were observed.

Conclusions

- Empagliflozin effectively improved glycemic control and kidney function.
- The drug reduced microalbuminuria, demonstrating a nephroprotective effect.
- It showed a favorable safety profile, with no hypoglycemia or adverse effects on liver function.
- SGLT-2 inhibitors may be recommended as an essential component of prevention and comprehensive treatment of CKD in patients with T2DM.