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# INTEGRATED THERAPEUTIC APPROACH TO PREVENT CARDIOVASCULAR COMPLICATIONS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS AND ARTERIAL HYPERTENSION

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**Abstract.** This article analyzes the effectiveness of an integrated therapeutic approach in preventing cardiovascular complications in patients with type 2 diabetes mellitus (T2DM) and arterial hypertension (AH). Based on clinical observation, the efficacy of conventional treatment and modern integrated therapy—including SGLT2 inhibitors, RAAS blockers, and statins—was compared. The obtained results demonstrate that a comprehensive approach significantly reduces cardiovascular events [2][3], improves glycemic control, and enhances renal function [2]. This study may aid clinicians in selecting optimal therapeutic strategies for this patient population.
**Keywords:** Type 2 diabetes mellitus, arterial hypertension, cardiovascular complications, integrated therapy, SGLT2 inhibitors, RAAS blockers, glycemic control.

## INTRODUCTION

Type 2 diabetes mellitus (T2DM) and arterial hypertension (AH) are among the most prevalent and significant risk factors for cardiovascular diseases. Global health statistics indicate that approximately 70–80% of patients with T2DM also suffer from AH, dramatically increasing the burden on the cardiovascular system [1]. When these conditions co-exist, their synergistic interaction accelerates the development of heart failure, myocardial infarction, stroke, peripheral artery disease, and chronic kidney disease.

Moreover, patients with diabetes often exhibit endothelial dysfunction, oxidative stress, inflammation, and the formation of atherosclerotic plaques. These processes are exacerbated in the presence of hypertension and lead to acute and chronic damage to the cardiovascular system [1]. To prevent and manage these complications, an integrated therapeutic strategy involving glycemic, pressor, and lipid control is essential.

Epidemiological studies confirm that the coexistence of T2DM and AH increases mortality from cardiovascular diseases by 2–4 times [1]. Consequently, a multifactorial and individualized therapeutic approach is of urgent importance in contemporary clinical practice.

T2DM and AH often coexist, and together they significantly increase the risk of heart failure, stroke, and myocardial infarction. Therefore, managing these patients requires a multifaceted approach (Williams et al., 2018).

To evaluate the efficacy of modern integrated therapeutic strategies in reducing cardiovascular complications in patients with coexisting T2DM and AH.

## MATERIALS AND METHODS

This study combined retrospective and prospective clinical observation and was conducted between 2022 and 2024 at specialized therapeutic centers in the Fergana region. A total of 120 patients diagnosed with T2DM and AH, confirmed by clinical and laboratory tests, were selected and randomized into two groups. Each group consisted of 60 patients aged between 45 and 75 years, with a balanced distribution of gender and comorbidities.

Group 1 (n=60): received only conventional antihypertensive (ACE inhibitors, beta-blockers) and hypoglycemic agents (metformin, sulfonylureas).

Group 2 (n=60): received integrated therapy, including:

- SGLT2 inhibitors (empagliflozin or dapagliflozin),

- RAAS blockers (enalapril, losartan),
- Statins (atorvastatin or rosuvastatin),
- Modern glycemic control agents (metformin, DPP-4 inhibitors).

Patients were treated over 12 months. Every three months, the following indicators were monitored:

- HbA1c levels,
- Systolic and diastolic blood pressure (SBP/DBP),
- Estimated glomerular filtration rate (eGFR),
- Cardiovascular events (myocardial infarction, stroke, heart failure episodes).

Data were collected from medical records, laboratory tests, and electrocardiography (ECG). Statistical analysis was performed using SPSS version 26.0. Differences were considered significant at $p<0.05$.

**RESULTS**

The group receiving integrated therapy (Group 2) demonstrated significant improvements in glycemic control (HbA1c), blood pressure (SBP), renal function (eGFR), and frequency of cardiovascular events. HbA1c levels dropped from 8.0% to 6.4%, indicating stable glycemic control. The reduction in blood pressure contributed to decreased cardiovascular load.

The incidence of cardiovascular events declined from 23.3% to 8.3% in Group 2, suggesting substantial risk reduction for heart failure and stroke. Renal function, measured by eGFR, remained relatively stable in Group 2 (76 → 72 ml/min/1.73m²), supporting the nephroprotective effect of the treatment.

In contrast, Group 1 showed only modest improvement: HbA1c dropped by 0.5%, and SBP decreased by 18 mmHg. However, renal function declined more noticeably (75 → 67 ml/min/1.73m²), reflecting insufficient organ protection.

Statistical analysis confirmed that all these indicators showed significant intergroup differences in favor of Group 2 ($p<0.05$).

**DISCUSSION**

The data indicate that a comprehensive therapeutic approach in patients with both T2DM and AH yields multifaceted benefits. Not only does it improve metabolic and hemodynamic parameters, but it also substantially reduces the incidence of severe cardiovascular complications. These outcomes align with previous international studies supporting the use of SGLT2 inhibitors, RAAS blockers, and statins in high-risk patient populations [2][3][4].

Integrated therapy addresses multiple pathogenic mechanisms: it reduces insulin resistance, suppresses RAAS-mediated vasoconstriction, lowers LDL cholesterol, and minimizes inflammation. Consequently, this multifactorial effect results in improved clinical outcomes across several systems—cardiovascular, renal, and metabolic.

Furthermore, modern antidiabetic medications such as SGLT2 inhibitors have demonstrated cardiovascular and renal protection beyond glucose-lowering effects. This supports their inclusion in updated treatment algorithms issued by leading diabetes associations [6][7].

**CONCLUSION**

The study results clearly indicate that an integrated therapeutic strategy significantly reduces the risk of cardiovascular complications in patients with T2DM and AH. Treatment regimens that include SGLT2 inhibitors, RAAS blockers, and statins provide combined metabolic, pressor, and nephroprotective effects that improve overall patient outcomes.

Such strategies not only stabilize blood glucose and blood pressure but also reduce the incidence of heart failure and stroke while preserving renal function. Therefore, this approach is recommended as a modern, evidence-based preventive measure for cardiovascular events [1–3].

The study's findings help physicians make scientifically grounded decisions in the management of patients with comorbid T2DM and AH, confirming the clinical value of integrated therapy in current medical practice.

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