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Exploring the Therapeutic Effects of SGLT2 & DPP-4 Inhibitors on Streptozotocin Induced Diabetes and Chronic Kidney Disease in Albino Wistar Rats

MOHD. IBRAHIM KHAN[1], DANISH AHMED[1], SAIF MOHAMMED SALEH ANSARI[2]
[1]Department of Pharmacology, SAM HIGGINBOTTOM UNIVERSITY OF AGRICULTURE TECHNOLOGY AND SCIENCCES (SHUATS), India
[2]Department of Biochemistry & Biochemical Engineering, SAM HIGGINBOTTOM UNIVERSITY OF AGRICULTURE TECHNOLOGY AND SCIENCCES (SHUATS), India

Objectives : Chronic kidney disease (CKD) and type 2 diabetes (T2D) often coexist, leading to significant morbidity and mortality, particularly due to renal dysfunction and cardiovascular complications. Empagliflozin and sitagliptin are two medications that offer protection for both the heart and kidneys but act through distinct mechanisms. Empagliflozin is a sodium-glucose cotransporter-2 (SGLT2) inhibitor, while sitagliptin is a dipeptidyl peptidase-4 (DPP-4) inhibitor. Recent studies suggest that combining these drugs could lead to improved outcomes for managing CKD and T2D.
Methods : This study examined the effects of empagliflozin and sitagliptin on individuals with CKD and T2D. Six groups of rats, each containing six animals, were used, along with normal, toxic, and standard control groups. Three experimental groups were administered either empagliflozin (10 mg daily), sitagliptin (20 mg daily), or a combination of both for 21 days. Key outcomes measured included changes in glycemic control, albuminuria, glomerular filtration rate (GFR), and cardiovascular health.
Results : Both empagliflozin and sitagliptin led to reductions in albuminuria and slowed the progression of CKD in T2D patients. The group receiving combination therapy showed a more significant decrease in albuminuria and a more substantial improvement in GFR compared to those treated with either drug alone. Additionally, the incidence of cardiovascular events, particularly myocardial infarction, was lower in the combination therapy group than in the control group.
Conclusions : Combining empagliflozin and sitagliptin resulted in superior cardio-renal outcomes, including significant reductions in albuminuria and better preservation of kidney function than monotherapy. The two drugs offered complementary benefits: sitagliptin primarily targeting inflammation and fibrosis, while empagliflozin focused on improving glucose metabolism and reducing glomerular hyperfiltration. These findings suggest that dual therapy could be a more effective strategy for managing CKD and T2D, warranting further research through long-term studies.