# Renal Outcomes of SGLT2 Inhibitors in Patients with Diabetes

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## PURPOSE

- Sodium-glucose 2 cotransporter (SGL2) inhibitors are newer oral hypoglycemic agents used to control type 2 diabetes (T2DM).
- There was a paucity of real-world evidence on the effectiveness of SGL2 inhibitors on the incidence of chronic kidney disease (CKD) compared to second-line glucose lowering agents.
- The present study examined the renal benefits of SGLT2 inhibitors in patients with T2DM relative to Second-line glucose lowering agents.

## METHODS

- Retrospective cohort study was conducted among patients with diabetes using the All of Us (AoU) research program.
- AoU is an observational longitudinal study comprised of American population that have been historically underrepresented in biomedical research.
- The primary outcome was the new onset of CKD in patients who took SGLT2 inhibitors versus other second-line anti-diabetes medications.
- All patients with T2DM above the age of 18 years old without history of CKD during the initiation of the glucose lowering agents were included.
- Proportional hazards regression was conducted to examine the association between the use of the anti-diabetes medications and the occurrence of CKD over the follow-up period.

## RESULTS

| Variables | SU (1760) | GLP-1 RA (415) | DPPP4i (1358) | SGLT2i (903) | Total (4436) |
|---|---|---|---|---|---|
| Follow-up (months) | 27.5(5.3) | 27.4(3.8) | 27.4(4.4) | 23.9(2.9) | 26.7 (2.8) |
| Females | 970 (21.8) | 252 (5.7) | 812 (18.3) | 473 (10.7) | 2507 (56.5) |
| Males | 749 (16.9) | 149 (3.3) | 509 (11.5) | 406 (9.1) | 1813 (40.8) |
| Unspecified | 41 (0.9) | 14 (0.3) | 37 (0.8) | 24 (0.5) | 116 (2.6) |
| Alcohol use (Yes) | 1504 (33.9) | 376 (8.5) | 1144 (25.8) | 780 (17.6) | 3774 (83.4) |
| DBP | 76.38(8.2) | 76.54(7.1) | 76.2(8) | 76.2(7.3) | 76.29(7.9) |
| GFR | 70(20.8) | 62.3(17.6) | 63.4(21) | 70.7(20.3) | 68(20.2) |
| HDL | 45.2(12) | 46.6(14.2) | 45.7(12.3) | 44.6(11.7) | 45.4(12.2) |
| BUN | 17.5(7.3) | 17.3(7) | 18.4(8.3) | 17.1(6) | 17.7(7.4) |
| SBP | 134(12.5) | 132(11.6) | 133.3(12.5) | 131(11.6) | 132.8(13.2) |
| BMI | 33.9(7.6) | 37.9(7.9) | 33.9(7.1) | 34.6(7.4) | 34.4(7.5) |
| TCHOL | 173.2(33.8) | 171.5(34.9) | 173(34.6) | 169.8(35.5) | 172.3(34.5) |
| Hemoglobin A1C | 7.9(1.8) | 7.7(1.9) | 7.8(1.7) | 8.1(1.6) | 7.9(1.5) |
| Statins (Yes) | 1271(28.1) | 282(6.2) | 971(21.5) | 666(14.7) | 3190(70.6) |

| Cox-Regression | |
|---|---|
| Variables | Hazard ratio (HR) |
| SGLT2i | Reference |
| DPP4i | 1.1[0.8-1.5] |
| GLP-1 RA | 2.5[1.25-5.24] |
| SU | 2.5[1.2-4.5] |
| BUN | 1.14[1.06-1.24] |
| GFR | 0.97 [0.95-0.99] |

SU: Sulfonylurea, GLP-1 Agonists: Glucagon-like peptide receptor agonists,
DPP4I: Dipeptidyl peptidase Inhibitors, DBP: diastolic blood pressure, SBP: Systolic blood pressure, TCHOL: Total cholesterol, HDL: High density lipoprotein, BMI: Body mass index

- Overall, 4436 patients were included in the analyses.
- The proportion of patients with new case of CKD was 21.6%.
- The hazard rate of CKD was 2.5 times higher in patients on GLP-1 RA 2.5[1.25-5.24, P=0.02] relative to SGLT2 inhibitors.
- Patients on sulfonylurea had a 2.5 times higher likelihood of CKD, 2.5[1.2-4.5, p=0.02] relative to SGLT2i users.
- For each unit increase in the blood urea nitrogen (BUN), the hazard of CKD increased by 14%,1.14[1.06-1.24, p<0.01].
- The incidence of CKD decreased by 3% when the glomerular filtration rate increased by one unit, 0.97 [0.95-0.99, p=0.02].

## DISCUSION & CONCLUSION

- Renal outcomes of SGLT2 inhibitors were better than other second-line anti-diabetes medications.
- The uptake of these medications should be ensured in diabetes patients to prevent CKD risk.

## REFRENCEES

1. Centers for Disease Control and Prevention. Chronic Kidney Disease Surveillance System—United States.website. http://www.cdc.gov/ckd.
2. ElSayed NA, Aleppo G, Aroda VR, Bannuru RR, Brown FM, Bruemmer D, et al. 9. Pharmacologic Approaches to Glycemic Treatment: Standards of Care in Diabetes—2023. Diabetes Care. 2023;46(Supplement_1):S140-S57.