Clinical Utilization of Sodium-Glucose Cotransporter 2 Inhibitors in Heart Failure at a Large Academic Hospital

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INTRODUCTION

- In randomized controlled studies, sodium-glucose cotransporter 2 inhibitors (SGLT2i) have demonstrated benefits for patients with heart failure (HF), including those with reduced ejection fraction (HFrEF) and preserved ejection fraction (HFpEF) [1-3].
- In 2022, the American College of Cardiology, the American Heart Association, and the Heart Failure Society of America jointly published an updated clinical practice guideline that advocates for the use of SGLT2i in HF patients regardless of the presence of type 2 diabetes mellitus (T2DM) [4].
- Despite these recommendations, the actual adoption and utilization of SGLT2i in real-world clinical settings remains unknown.

OBJECTIVE

The study aimed to investigate the prescribing patterns of SGLT2i within a large academic hospital.

METHODS

- **Design**: The retrospective cross-sectional study was conducted at the Cardiology Group at Thomas Jefferson University Hospital in Philadelphia, focusing on the first prescription of SGLT2i (canagliflozin, dapagliflozin, empagliflozin, and ertugliflozin) in HF patients. The Institutional Review Board at the university approved the study protocol.
- **Data and Study Population**: Outpatient electronic health records of HF patients, who had received care at the hospital from June 2020 to June 2023, were identified using International Classification of Diseases, Tenth Revision, Clinical Modification diagnosis code I50. Patients were categorized into four cohorts: HF only, HF with T2DM, HF with chronic kidney disease (CKD), and HF with both CKD and T2DM.
- **Study Outcomes**: The primary outcome was to evaluate SGLT2i treatment rates in each cohort.
- **Statistical Analysis**: Baseline characteristics were summarized across cohorts using standardized difference. The data were analyzed using the SAS® software, version 9.4 (SAS Institute Inc., Cary, NC).

Abbreviations: ACEi: Angiotensin-converting enzyme inhibitor; ARBs: Angiotensin II receptor blockers; ARNi: Angiotensin receptor-neprilysin inhibitor; ß-blockers: Beta-blockers; CKD: Chronic kidney disease; HF: Heart failure; HFpEF: Heart failure with preserved ejection fraction; HFrEF: Heart failure with reduced ejection fraction; MRA: Mineralocorticoid receptor antagonist; SD: Standard deviation; SGLT-2i: Sodium glucose cotransporter 2 inhibitors; Std Diff: Standardized difference

RESULTS

Table 1. Baseline Characteristics

	Total n = 2995	SGLT2i n = 828 (27.7)	No SGLT2i n = 2167 (72.3)	Std Diff
Mean Age±SD	65.8±13.8	61.9±12.5	67.2±13.9	0.41
Sex (%)				
Male	1657 (55.3)	506 (61.1)	1151 (53.1)	0.16
Race (%)				
White	1537 (51.3)	348 (42.0)	1189 (54.9)	0.26
Black	1173 (39.2)	400 (48.3)	773 (35.7)	0.26
Hispanic	124 (4.1)	42 (5.1)	82 (3.8)	0.06
Asian	96 (3.2)	19 (2.3)	77 (3.6)	0.07
Other	65 (2.2)	19 (2.3)	46 (2.1)	0.01
HF Type (%)				
HFpEF	1829 (61.1)	358 (43.2)	1471 (67.9)	0.51
HFrEF	1166 (38.9)	470 (56.8)	696 (32.1)	0.51
Comorbidities (%)				
T2DM	1217 (40.6)	506 (61.1)	711 (32.8)	0.59
CKD	741 (24.7)	195 (23.6)	546 (25.2)	0.04
Medication History (%)				
ß-blocker	2479 (82.8)	746 (90.1)	1733 (80.0)	0.29
ACEi or ARB	1923 (64.2)	560 (67.6)	1363 (62.9)	0.10
Statin	2204 (73.6)	650 (78.5)	1554 (71.7)	0.16
MRA	849 (28.3)	479 (57.9)	370 (17.1)	0.93
ARNi	755 (25.2)	445 (53.7)	310 (14.3)	0.92
Payer Type (%)				
Medicare	2454 (85.7)	656 (82.4)	1798 (86.9)	0.10
Medicaid	370 (12.9)	127 (16.0)	243 (11.8)	0.12
Commercial	40 (1.4)	13 (1.6)	27 (1.3)	0.03

Figure 1. Utilization of SGLT2i by HF Type

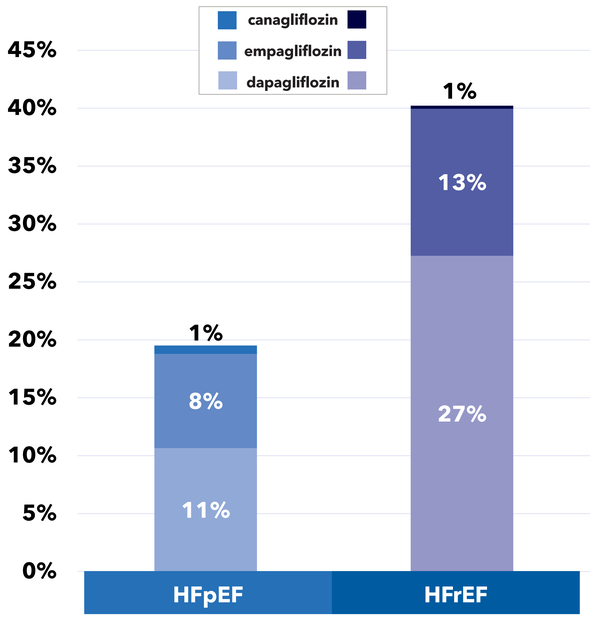


Figure 2. Trend of SGLT2i prescription from 2020 - 2023

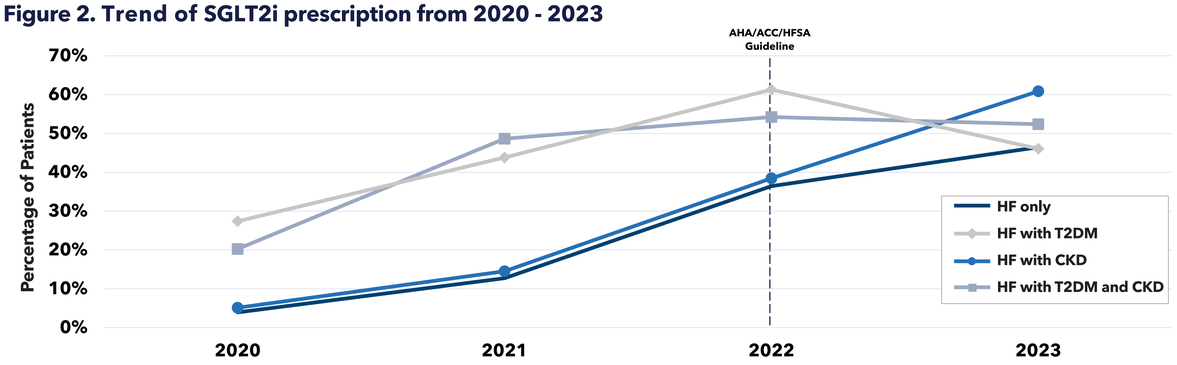
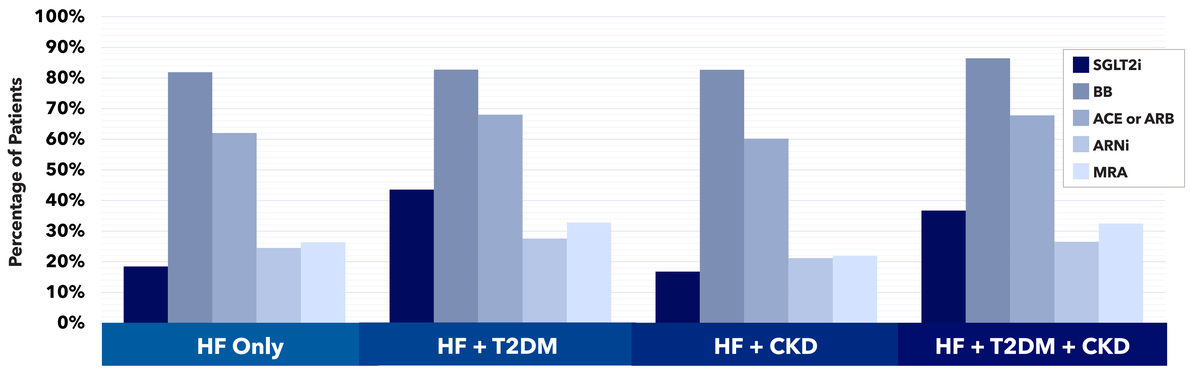


Figure 3. HF prescription distribution by cohort



DISCUSSION

- While the number of SGLT-2i prescription in HF-only patients saw a nine-fold increase from 2020 to 2023 (3.9% to 46.5%), the rate of SGLT-2i use in these patients remained below that of HF patients with additional comorbid conditions.
- Despite SGLT2i being recommended as one of two primary treatment for HFpEF, the uptake was limited (19.6%) compared to HFrEF (40.3%).
- SGLT2i use remained significantly lower than common secondary prevention agents like Beta-Blockers, ACE inhibitors, ARBs, ARNis, and MRAs across all patient cohorts.

LIMITATIONS

- With hospital claims data, we were unable to capture SGLT2i prescriptions that were written but not filled by patients, which may have underestimated intended SGLT2i prescribing.
- Due to the nature of administrative data, the patients' preferences and the reasoning behind prescription decisions remained unclear.

CONCLUSION

- Despite clinical guideline recommendations, SGLT2i remain underutilized in HF patients, particularly among those with HFpEF and without comorbidities.
- Future studies should explore which patient factors and physicians' traits impact SGLT2i use in HF patients.

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