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ORIGINAL RESEARCH

ATRIAL FIBRILLATION - MEDICAL THERAPY

Impact of SGLT2 Inhibitors on AF Recurrence After Catheter Ablation in Patients With Type 2 Diabetes

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ABSTRACT

BACKGROUND The effects of sodium-glucose cotransporter 2 inhibitors (SGLT2-Is) on recurrent atrial fibrillation (AF) among patients undergoing catheter ablation is not well described.

OBJECTIVES This study sought to assess the impact of SGLT2-Is on the recurrence of AF among patients with type 2 diabetes mellitus (DM) after catheter ablation.

METHODS Using the TriNetX research network, we identified, by means of Current Procedural Terminology codes, patients ≥18 years of age with type 2 diabetes mellitus (DM) who had undergone AF ablation from April 1, 2014, to November 30, 2021. Patients were stratified based on the baseline SGLT2-I use. Propensity-score matching resulted in 2,225 patients in each cohort. The primary outcome was a composite of cardioversion, new antiarrhythmic drug (AAD) therapy, or re-do AF ablation after a blanking period after the index ablation. Additional outcomes included heart failure exacerbations, ischemic stroke, all-cause hospitalization, and death during 12 months of follow-up.

RESULTS SGLT2-I use in patients with type 2 DM undergoing AF ablation was associated with a significantly lower risk of cardioversion, new AAD therapy, and re-do AF ablation (adjusted OR: 0.68; 95% CI: 0.602-0.776; $P < 0.0001$). At 12 months, patients on SGLT2-Is had a higher probability of event-free survival (HR: 0.85, 95% CI: 0.77-0.95; log-rank test chi-square = 8.7; $P = 0.003$). All secondary outcomes were lower in the SGLT2I group; however, the ischemic stroke did not differ between groups.

CONCLUSIONS Use of SGLT2-Is in patients with type 2 DM is associated with a lower risk of arrhythmia recurrence after AF ablation and thence a reduced need for cardioversion, AAD therapy, or re-do AF ablation.
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ABBREVIATIONS AND ACRONYMS

AAD = antiarrhythmic drug

AF = atrial fibrillation

ECG = electrocardiography

DM = diabetes mellitus

LVEF = left ventricular ejection fraction

HF = heart failure

PSM = propensity-score matching

SGLT2-I = sodium-glucose cotransporter 2 inhibitor

Atrial fibrillation (AF) is the most common arrhythmia in adults and affects more than 33.5 million adults worldwide.[1-3] AF is associated with considerable morbidity, mortality, and impairment in quality of life.[4,5] It independently increases mortality by 2-fold in women and 1.5-fold in men.[6,7] Concomitant heart failure (HF), which can be both a cause and a consequence of AF, further increases the risk of rehospitalizations and all-cause mortality in patients with AF.[8-10] Catheter ablation has been shown in multiple randomized control trials to be superior to antiarrhythmic drug (AAD) therapy in maintaining sinus rhythm.[11-21] A particularly important population of patients with AF are those with heart failure (HF), in whom catheter ablation has been shown to decrease the recurrence of atrial arrhythmias, improve left ventricular ejection fraction (LVEF), and reduce HF exacerbations, cardiovascular hospitalizations, and mortality compared with medical therapy alone.[9,12,13,15,22-25] Ultimately, this has significant economic implications because an estimated 40% of AF patients are hospitalized each year, with an annual direct cost of $26 billion.[2,3,26]

Recurrent AF after catheter ablation is relatively common and occurs in 20% to 40% of patients.[27] This leads to further interventions, such as cardioversion, need for ongoing or new AAD therapy, and re-do ablations. AAD therapies can have significant drug-drug interactions and can result in serious side-effects.[28,29] Similarly, although complication rates with AF ablation are relatively low, re-do ablation has been shown to be an independent predictor of adverse outcomes.[30] Therefore, prevention of recurrent AF is beneficial for those undergoing catheter ablation.

Diabetes mellitus (DM) has been implicated in the development and progression of both AF and HF.[31] Several mechanisms have been linked to the progression of AF, including microvascular dysfunction, myocyte hypertrophy, and increased proinflammatory cytokines. However, therapies leading to strict glucose control have been shown to have a neutral or harmful impact in diabetic patients with HF and AF.[32-37] Sodium-glucose cotransporter 2 inhibitors (SGLT2-Is) are a class of oral hypoglycemic medication with beneficial effects in patients with DM and atherosclerotic cardiovascular disease, as well as in those with HF.[32,34,38,39] In addition, they have been associated with a reduction in the burden of AF, though it has not been studied as a primary endpoint.[33,34,38] Volume contraction due to inhibition of the glucose cotransporter in the proximal tubule and pleiotropic effects through reduced proinflammatory signaling in atrial tissues are a few potential mechanisms contributing to the observed cardiovascular benefits of SGLT2-Is.[36,37,40]

Although several studies have demonstrated a reduction in the incidence and overall burden of AF in patients treated with SGLT2-Is, the impact of these agents in patients with type 2 DM who have undergone an AF ablation is not known. Therefore, in this study, we aimed to explored the effects of SGLT2-Is on AF recurrence in patients with type 2 DM who have undergone AF ablation.

METHODS

STUDY OVERSIGHT. The data were analyzed and interpreted by the authors. All authors reviewed the manuscript and affirmed the accuracy and completeness of the data. The protocol was exempt from institutional review board approval by the Lahey Hospital and Medical Center IRB, given that aggregate de-identified data were used from a research network database. The study findings are reported according to Strengthening the Reporting of Observational Studies in Epidemiology guidelines for cohort studies.

DATA SOURCE. We used the research network of the TriNetX Analytics Network database. TriNetX is a largely U.S.-based multicenter federated health research network aggregating anonymized data from electronic health records of more than 250 million patients at the time of our search and more than 120 U.S. health care organizations (HCOs). The research network contains data on more than 88 million patients from 72 HCOs. Although the data are organized in aggregate de-identified form, the built-in analytics allows for the generation of patient-level data for cohort selection and matching, analyzing incidence and prevalence of events in a cohort, and comparing characteristics and outcomes between matched cohorts. More information on the database can be found elsewhere.[41]

STUDY POPULATION AND DESIGN. We conducted a retrospective propensity-matched cohort analysis on patients ≥18 years of age with a history of type 2 DM who had undergone AF ablation from April 1, 2014, to November 30, 2021. AF ablations were identified by means of Current Procedural Terminology (CPT) codes 93656 (intracardiac catheter ablation of atrial fibrillation by pulmonary vein isolation) and 93657 (linear or focal intracardiac catheter ablation of the left or right atrium for treatment of atrial fibrillation

remaining after completion of pulmonary vein isolation). Patients were further identified and subdivided into 2 groups based on their use of SGLT2-Is at baseline. Cohorts were matched with the use of propensity-score matching.

STUDY OUTCOMES. The main composite outcome of this study was the need for cardioversion, new class I or III AAD therapy, or re-do AF ablation after a 3-month blanking period after the index AF ablation. Other outcomes included individual components of the main composite endpoint. In addition, we assessed acute HF exacerbations (defined by International Classification of Diseases (ICD) codes or need for intravenous diuretics), ischemic stroke, all-cause hospitalization, and all-cause mortality. All outcomes were analyzed from 3 to 12 months after the index AF ablation to account for a 3-month blanking period after the index event.

STATISTICAL ANALYSIS. The patient population was stratified into 2 cohorts based on their use of SGLT2-Is at the time of index ablation. Continuous variables are presented as mean ± SD and were compared between the cohorts by means of independent-sample *t*-tests for continuous variables. Categoric variables are reported as n (%) and compared by means of the χ^2 test. To control for baseline differences in the patient cohorts, 1:1 PSM was performed, leveraging a built-in PSM algorithm that uses the greedy nearest-neighbor algorithm with a caliper of 0.1 pooled SDs. Any characteristic with a standardized mean difference between cohorts of <0.1 was considered to be well matched. Adjusted ORs with 95% CIs were calculated for primary and secondary outcomes. Survival analysis was performed by plotting Kaplan-Meier curves with log-rank tests to compare the 2 cohorts. Statistical significance was set at a 2-sided *P* value of <0.05. Statistical analyses were completed with the use of the TriNetX online platform using R for statistical computing.

RESULTS

STUDY POPULATION. Among the patients with a history of type 2 DM who had undergone AF ablation, 10,974 were not receiving an SGLT2-I, and 2,366 were. After PSM based on their covariates, 2,225 patients remained in each cohort and were included in the analysis, as shown in Figure 1.

PATIENT CHARACTERISTICS. Baseline characteristics of the patients, before and after PSM, are presented in Table 1. Before PSM, patients treated with SGLT2-Is were of similar age but had a higher proportion of men (75% vs 65%) than those not treated with SGLT2-Is. The majority of the cohort was White, with only 10% Black individuals. However, the proportions of White and Black patients were similar in both groups. Patients on SGLT2-Is had a higher prevalence of cardiovascular risk factors, established cardiovascular disease, neoplasms, and chronic kidney disease, and were more likely to be on cardiovascular medications at baseline. Patients on SGLT2-Is also had a higher mean hemoglobin A_{1c} (7.5% vs 6.7%; $P < 0.0001$). After PSM, baseline characteristics in the 2 groups were similar and no residual imbalance was found (standard difference: <0.1 for all covariates).

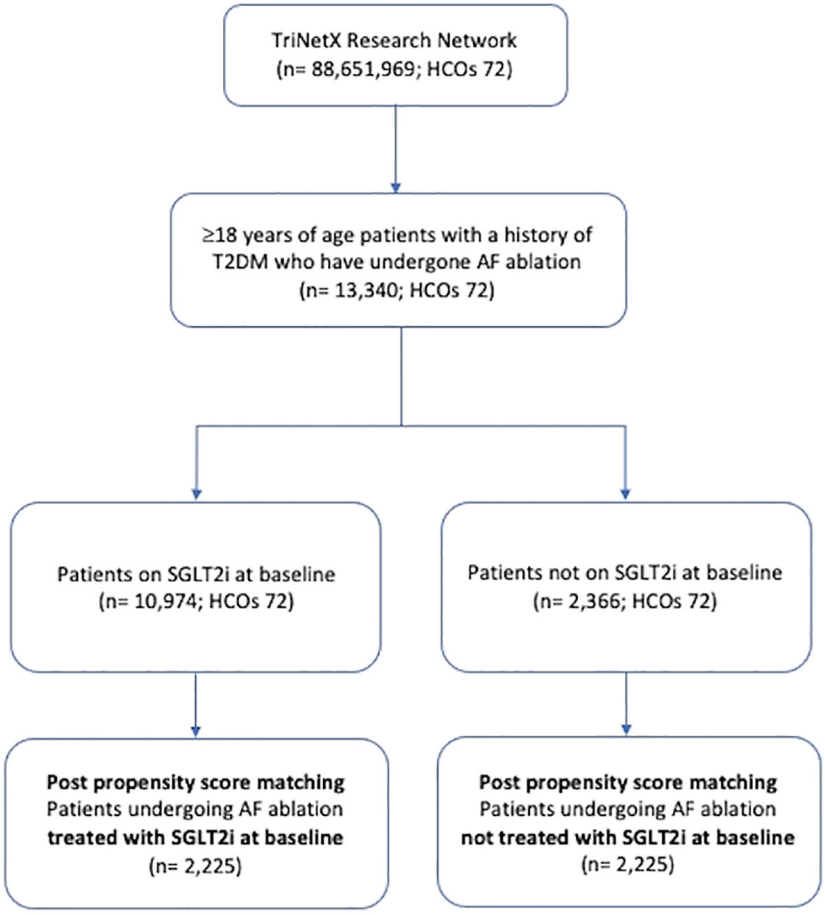
STUDY OUTCOMES. Main outcome. The main composite outcome (cardioversion, new class I or III AAD use, or re-do ablation) after the index AF ablation occurred in 619 patients (27%) on SGLT2-Is compared with 802 patients (36%), not on SGLT2-Is (adjusted OR [aOR]: 0.68; 95% CI: 0.602-0.776) after a 3-month blanking period (Table 2). Furthermore, the probability of event-free survival at 12 months (66% vs 61%; $P = 0.003$; HR: 0.85; 95% CI: 0.77-0.95) was higher in the SGLT2-I group (Figure 2).

Other outcomes. Individual components of the main composite outcome occurred less frequently in patients on SGLT2-Is compared with those not on SGLT2-Is. Cardioversion (aOR: 0.62; 95% CI: 0.49-0.80; $P < 0.0001$), new class I or III AAD use (aOR: 0.72; 95% CI: 0.63-0.82; $P < 0.0001$), and re-do ablations for AF (aOR: 0.71; 95% CI: 0.53-0.95; $P = 0.022$) 3 months after the index ablation were all lower for patients receiving SGLT2-Is (Table 2). HF exacerbations (aOR: 0.81; 95% CI: 0.71-0.91; $P = 0.001$) and all-cause hospitalizations (aOR: 0.78; 95% CI: 0.68-0.91; $P = 0.001$) also were reduced in patients on SGLT2-Is (Table 2). The overall incidence of ischemic stroke was low in both groups, and no significant difference was noted between groups (aOR: 0.63; 95% CI: 0.36-1.10; $P = 0.098$). All-cause mortality was lower among patients on SGLT2-Is (aOR: 0.62; 95% CI: 0.41-0.93; $P = 0.019$) (Table 2).

DISCUSSION

This exploratory retrospective observational analysis found that SGLT2-I use in patients with type 2 DM was associated with a lower risk of recurrent AF after an index AF ablation. Specifically, SGLT2-I use was associated with a lower need for cardioversion, new class I or III AAD therapy, and re-do ablation 3 to 12 months after the index AF ablation. In addition, patients treated with SGLT2-Is had a lower incidence

FIGURE 1 CONSORT Diagram



Proportion of adult patients with type 2 diabetes mellitus (T2DM) undergoing atrial fibrillation (AF) ablation stratified by the use of sodium-glucose cotransporter 2 (SGLT2) inhibitors. HCO = health care organization.

of HF exacerbations, all-cause hospitalizations, and death after AF ablation. However, there was no significant difference in the incidence of ischemic stroke between patients treated with and without SGLT2-Is (**Central Illustration**).

Catheter ablation for both paroxysmal and persistent AF has been demonstrated to be associated with a significantly lower rate of all-cause mortality and hospitalization for worsening HF compared with medical therapy.[19-22,25] However, arrhythmia recurrence after successful initial ablation occurs in at least 20% to 40% of patients.[15,18,25] This usually leads to repeated cardioversion, AAD use, or repeated ablations. In many cases, it also means acceptance of AF rather than pursuing additional rhythm control interventions.

In a pooled analysis of 31 randomized controlled trials of more than 75,000 patients, the use of SGLT2-Is was associated with a 25% relative risk reduction of AF and atrial flutter compared with the placebo or control arm. Our findings agree with this pooled analysis and other individual studies.[33,38] However, our study uniquely demonstrates the utility of SGLT2-Is in reducing recurrent AF after undergoing ablation. In our study, the use of SGLT2-Is was associated with a 23% relative risk reduction for the composite endpoint of cardioversion, new initiation of class I or III AAD therapy, or re-do ablation as a surrogate marker for clinically meaningful AF recurrence after the index AF ablation. Importantly, our results suggest that the number needed to treat with SGLT2-Is to prevent AF recurrence at 12 months

TABLE 1 Baseline Characteristics of the Patient Cohort Before and After PSM

	Before PSM			After PSM		
	Not on SGLT2-I (n = 10,974)	On SGLT2-I (n = 2,326)	Standardized Difference	Not on SGLT2-I (n = 2,225)	On SGLT2-I (n = 2,225)	Standardized Difference
Demographics						
Age, y	65.8 ± 9.4	65.3 ± 9.1	0.046	65 ± 9	65 ± 9	0.053
Female	3,808 (34)	596 (24)	0.209	583 (26)	577 (25)	0.006
Not Hispanic or Latino	9,292 (84)	2,052 (86)	0.059	1,942 (87)	1,928 (87)	0.019
White	9,050 (83)	1,932 (82)	0.021	1,833 (82)	1,823 (82)	0.019
Black or African American	216 (10)	221 (10)	0.045	173 (9)	172 (9)	0.008
Comorbid conditions						
Hypertension	8,866 (81)	2,202 (93)	0.370	2,067 (93)	2,062 (93)	0.009
Dyslipidemia	7,564 (69)	2,029 (86)	0.410	1,907 (85)	1,892 (85)	0.019
Ischemic heart disease	5,502 (50)	1,607 (68)	0.368	1,473 (66)	1,480 (66)	0.007
BMI ≥30 kg/m^2	4,496 (41)	1,217 (51.4)	0.211	1,126 (50.6)	1,141 (51.3)	0.013
Heart failure	4,313 (39)	1,449 (61)	0.450	1,302 (58)	1,316 (59)	0.013
Thyroid disorder	2, 825 (26)	722 (31)	0.106	666 (30)	677 (30)	0.011
CKD stage 3	1,457 (13)	535 (23)	0.245	440 (20)	492 (22)	0.057
CKD stage 4	372 (3.4)	95 (4.0)	0.033	122 (5.5)	85 (4)	0.079
Medications						
Statin	7,403 (68)	2,057 (87)	0.477	1,934 (86)	1,924 (86)	0.013
Diuretics	6,867 (63)	1,962 (83)	0.469	1,832 (82)	1,824 (82)	0.009
ACE inhibitors	5,036 (46)	1,504 (63)	0.361	1,412 (64)	1,393 (63)	0.018
ARBs	3,545 (32)	1,272 (53)	0.444	1,139 (51)	1,139 (51)	<0.001
Sacubitril-valsartan	235 (2)	337 (14)	0.452	187 (8)	227 (10)	0.062
Beta-blockers	8,975 (82)	2,247 (95)	0.420	2,110 (94)	2,107 (94)	0.006
Antiarrhythmics	8,423 (77)	2,170 (92)	0.420	2,008 (90)	2,029 (91)	0.033
Digitalis	1,732 (16)	605 (26)	0.243	539 (24)	543 (24)	0.004
Insulin	4,255 (39)	1,738 (74)	0.746	1,635 (73)	1,604 (72)	0.031
Metformin	4,336 (40)	1,721 (73)	0.711	1,642 (73)	1,597 (71)	0.045
Glipizide	976 (9)	520 (22)	0.368	486 (21)	475 (21)	0.012
Anti-Platelet	6,871 (63)	1,819 (77)	0.314	1,696 (76)	1,690 (76)	0.006
Anticoagulation	9,666 (88)	2,324 (98)	0.410	2,188 (98)	2,183 (97)	0.017
Laboratory values						
Creatinine, mg/dL	1.2 ± 1.4	1.2 ± 2.8	0.011	1.3 ± 2.2	1.2 ± 2.9	0.045
LDL, mg/dL	83.5 ± 34	74.1 ± 32	0.285	77 ± 33	74 ± 32	0.089
HbA_{1c} ≥7%	2,500 (22.8)	1,326 (56)	0.532	1,234 (55.5)	1,216 (54.7)	0.016
BNP ≥150 pg/mL	1,779 (16.2)	688 (29.1)	0.311	560 (25.2)	610 (27.4)	0.051
NT-pro-BNP ≥450 pg/mL	1,484 (13.5)	466 (19.7)	0.166	495 (22.2)	418 (18.8)	0.086
LVEF ≤40%	604 (5.5)	257 (11)	0.196	226	220	0.009

Values are mean ± SD or n (%). Any characteristic with a standardized mean difference between cohorts <0.10 was considered to be well matched.

ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker; BNP = B-type natriuretic peptide; BMI = body mass index; CKD = chronic kidney disease; HBA_{1c} = hemoglobin A_{1c}; LDL = low-density lipoprotein; LVEF = left ventricular ejection fraction; NT- proBNP = N-terminal pro-B-type natriuretic peptide; PSM = propensity-score matching; SGLT2-I = sodium-glucose cotransporter 2 inhibitor.

after index ablation is 12 patients. This suggests a substantial benefit that needs to be further investigated in prospective trials.

AF ablation is associated with a 1% to 8% complication rate, including pericardial effusion, vascular access site complications, stroke or transient ischemic attack, atrio-esophageal fistula, phrenic nerve palsy, and pulmonary vein stenosis.[42] Re-do ablation has been shown to be an independent predictor of adverse outcomes.[30] In the present analysis, the overall incidence of ischemic stroke was low and there was no statistically significant difference in the rate of ischemic stroke between those treated with vs without an SGLT2-I. Even though, we did not directly assess the rate of other complications in those treated with and without an SGLT2-I, we hypothesize that the SGLT2-I use may lead to fewer long-term complications. This should be evaluated in future prospective studies.

Although the exact mechanisms underlying the beneficial impact of SGLT2-Is in reducing recurrent AF remain unclear, it is likely multifactorial through

TABLE 2 Primary and Secondary Outcomes

	Risk of Event, %			
	Not on SGLT2-I (n = 2,225)	On SGLT2-I (n = 2,225)	OR (95% CI)	*P* Value
Cardioversion, new initiation of class I/III AAD therapy, or re-do AF ablation	36.0	27.8	0.684 (0.602-0.776)	<0.0001
Cardioversion	7.8	5.0	0.623 (0.487-0.796)	<0.0001
New initiation of class I/III AAD therapy	32.4	25.6	0.715 (0.628-0.815)	<0.0001
Re-do AF ablation	5.0	3.6	0.710 (0.530-0.953)	0.022
Heart failure exacerbation	39.6	34.6	0.806 (0.713-0.910)	0.001
Ischemic stroke	1.7	1.1	0.635 (0.364-1.095)	0.098
All-cause hospitalization	23.9	19.8	0.648 (0.680-0.905)	0.001
All-cause mortality	2.7	1.7	0.616 (0.409-0.928)	0.019

Values are % unless otherwise indicated. Outcomes are compared between 3 to 12 months after the index AF ablation to account for the blanking period.

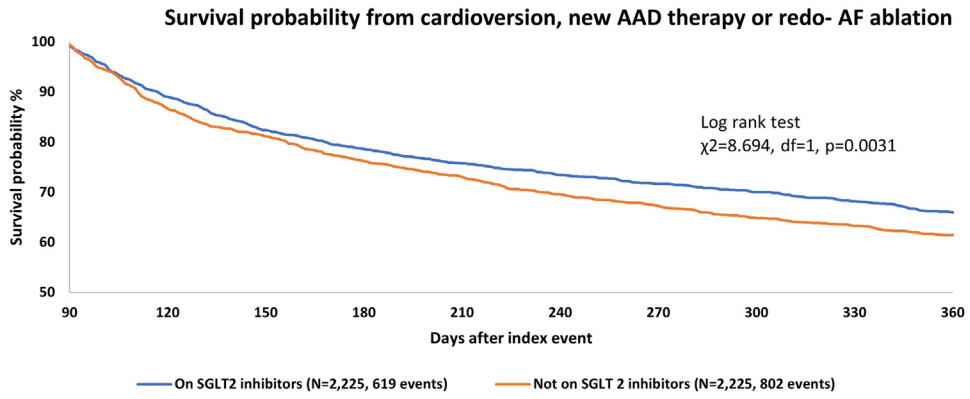
AAD = antiarrhythmic drug; AF = atrial fibrillation; SGLT2-I = sodium-glucose cotransporter 2 inhibitor.

the reduction in body weight, blood pressure, and intravascular volume.[36] Reduced atrial fibrosis and adverse remodeling have also been demonstrated in preclinical mechanistic studies and nonhuman animal models.[37] Improvements in cellular metabolism and bioenergetics, such as ion handling and mitochondrial function, also have been described.[36-40] Thus, SGLT2-Is may affect multiple steps in the disease process, preventing alterations in atrial electrical tissue properties and reducing the risk of AF development.

HF is one of the most common adverse events noted in patients with AF.[35] Catheter ablation for both paroxysmal and persistent AF has been demonstrated to be associated with a significantly lower rate of hospitalizations for worsening HF and all-cause mortality compared with medical therapy.[19-22,25] However, arrhythmia recurrence after successful initial ablation occurs in at least 20% to 40% of patients.[15,18,25] This usually leads to repeated cardioversion, AAD use, or repeated ablations. In many cases, it also means acceptance of AF rather than pursuing additional rhythm control interventions. The present data demonstrate a reduction in HF exacerbations, all-cause hospitalizations, and all-cause mortality after the index AF ablation with the use of SGLT2-Is. These findings are in agreement with existing clinical trials.[31,32,38,39] Although the reduced incidence of new-onset and recurrent AF in HF patients with the use of SGLT2-Is has been reported previously, we think that the present analysis is the first to demonstrate a reduction in HF exacerbations and hospitalizations after AF ablation.[33,34]

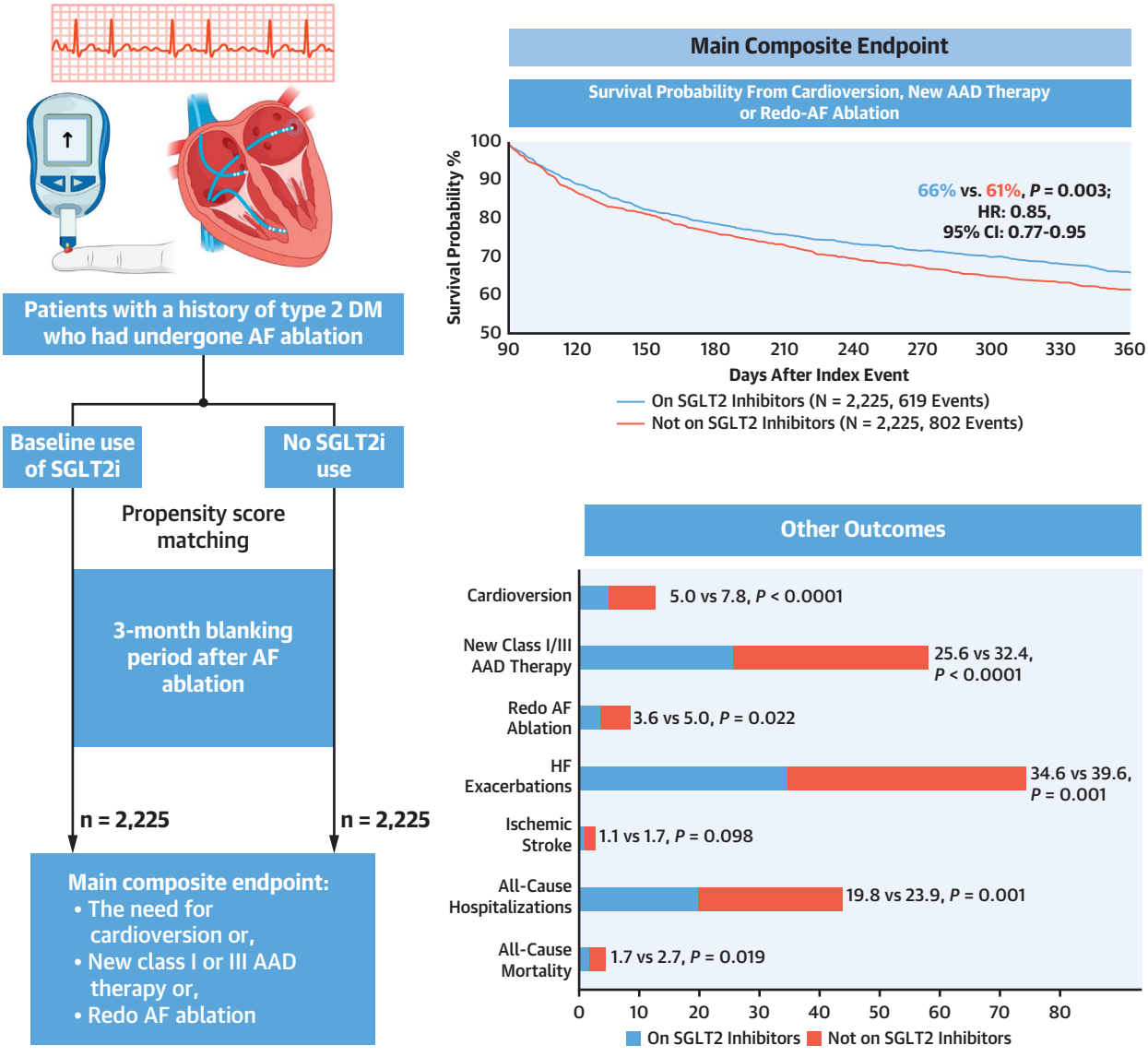
It is important to note that all patients in our study had type 2 DM. Given that most of the study period included the period before SGLT2-I approval for HF, the primary reason for SGLT2-I prescription in our cohort was type 2 DM. However, we chose not to exclude patients with concomitant HF in our analysis,

FIGURE 2 Efficacy of SGLT2-I in Reducing the Risk of Cardioversion, New Initiation of Class I or III AAD Therapy, or Redo Ablation After the Index AF Ablation



Survival analysis with a cumulative percentage comparison of cardioversion, new antiarrhythmic drug (AAD) therapy, or re-do ablation after the index AF ablation among patients treated with vs without sodium-glucose cotransporter 2 (SGLT2) inhibitors for type 2 diabetes mellitus. The cumulative percentage was estimated for each treatment group with the use of the Kaplan-Meier method. Log-rank test was used to compare outcomes between the 2 groups.

CENTRAL ILLUSTRATION **Impact of SGLT2 Inhibitors on Recurrence of Atrial Fibrillation After Catheter Ablation**



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This figure illustrates the study design, outcomes and Kaplan-Meier analyses of the impact of SGLT2-Is among patients with type 2 DM on recurrence of atrial fibrillation after catheter ablation during the 12 month follow up period (after 3 month blanking period post ablation). The results demonstrates reduced need for subsequent cardioversion, new class I or III AAD therapy, and re-do AF ablation in patients on SGLT2-Is therapy. Additionally, patients on SGLT2-Is had a lower incidence of heart failure exacerbation, all-cause hospitalization and all-cause mortality, while no significant difference was noted in the incidence stroke post ablation. AAD = anti arrhythmic drug; AF = atrial fibrillation; SGLT2-I = sodium-glucose cotransporter 2 inhibitor; DM = diabetes mellitus.

because more than one-half of the patients in each cohort had a diagnosis of HF. HF is common in patients with DM and can lead to or be the consequence of AF. Although it is likely that some of the beneficial impact of SGLT2-Is observed in our study, such as reduced HF exacerbations, all-cause hospitalizations, and all-cause mortality, may be due to the now-known benefits of SGLT2-I therapy in patients

with HF, our focus was on the recurrence of AF after catheter ablation, which is equally novel and relevant in patients with or without HF.

STUDY LIMITATIONS. The main limitation, which is inherent to all observational studies, is residual unmeasured confounding. In addition, our data were obtained retrospectively with the use of an electronic medical record that relies on valid documentation of diagnostic disease codes, leading to inherent limitations related to miscoding. However, these limitations should have been applied equally to patients treated with and without SGLT2-Is. To overcome these limitations in coding, we used CPT codes to identify components of the primary outcomes, such as ablation, cardioversion, and re-do ablation, which are often more reliable than disease codes. Second, the true incidence of recurrent AF after ablation may not have been captured in this analysis, because patients may have had recurrent AF after ablation but not been treated with cardioversion, AAD, or re-do ablation. However, the fact that these patients underwent a rhythm control strategy initially with the use of AF ablation reflects that they had a strong enough indication to justify the index procedure for the maintenance of sinus rhythm, making it very likely that the same would have been attempted in the event of recurrent AF. Furthermore, the database only captures outcomes if a patient remains in the same or other participating health care organization, and thus we may have missed some recurrent AF events. However, again, this should have affected both groups equally. We did not subdivide patients based on whether they had paroxysmal or persistent AF. Although ICD-10 coding allows for the designation of types of AF, we suspect that the coding of this item is unreliable.[43] Finally, the social determinants of health and other unmeasurable confounding factors may have played a role in outcomes that we are not able to account for.

CONCLUSIONS

In summary, this retrospective analysis suggests that the use of SGLT2-Is in patients with type 2 DM undergoing AF ablation is associated with a lower risk of needing subsequent cardioversion, new AAD therapy, and re-do AF ablation. This suggests that SGLT2-Is may increase the likelihood of maintaining sinus rhythm after AF ablation in patients with type 2 DM and AF. Our results also demonstrated a reduction in downstream adverse events, including HF exacerbation, all-cause hospitalization, and all-cause mortality during the 12-month follow-up period after AF ablation. This generates an important hypothesis, and further prospective studies are needed to validate these findings in patients with type 2 DM and AF who have undergone AF ablation.

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PERSPECTIVES

COMPENTENCY IN PATIENT CARE AND PROCEDURAL SKILLS: In patients with type 2 diabetes mellitus undergoing ablation for atrial fibrillation, use of SGLT2-Is was associated with improved outcomes, including a higher likelihood of maintaining sinus rhythm and lower rates of heart failure exacerbation, all-cause hospitalization, and all-cause mortality.

TRANSLATIONAL OUTLOOK: Future prospective randomized studies are needed to evaluate improved outcomes with SGLT2-Is for patients with or without type 2 diabetes undergoing atrial fibrillation ablation. Basic science studies are also required to better understand the mechanisms by which SGLT2-Is may provide antiarrhythmic benefits. This will help further expand its indications beyond heart failure and coronary artery disease.

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APPENDIX For supplemental tables, please see the online version of this paper.