History of Atrial Fibrillation as a Risk Factor in Patients With Heart Failure and Preserved Ejection Fraction

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Background—Atrial fibrillation (AFib) is common in heart failure (HF) with preserved ejection fraction (HFpEF). Current AFib stroke risk prediction models include the presence of HF but do not specifically include HFpEF as a risk factor. Whether a history of AFib should be used to identify patients with HFpEF who are at risk has not been established.

Methods and Results—Baseline characteristics and outcomes of patients with HFpEF in the Irbesartan in Heart Failure with Preserved Ejection Fraction Trial were analyzed in relation to AFib. At baseline, 1209 (29.3%) had a history of AFib. Of these 557 (13.5%) had history of AFib alone, whereas 670 (16.2%) had both a history and AFib on ECG; 2901 (70.3%) had neither. There were no significant differences in the risk of stroke between the 2 groups with a history of AFib who did or did not have AFib present on baseline ECG. During a median follow-up of 53 months, a fatal or nonfatal stroke occurred in 6.5% (79/1209) patients with history of AFib compared with 3.9% (114/2901) with no AFib. Having a history of AFib was independently associated with higher risk of stroke (hazard ratio, 2.2; 95% confidence interval, 1.6–3.2; $P<0.0001$) compared with those with no history of AFib.

Conclusions—In patients with HFpEF, a history of AFib was common and independently associated with increased risk of stroke, regardless of whether AFib was present on ECG. Patients with HFpEF and a history of AFib should be considered at risk. Further studies are needed to determine whether this risk can be safely reduced.

Clinical Trial Registration—URL: http://www.clinicaltrials.gov. Unique identifier: NCT000095238.

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Key Words: atrial fibrillation ■ heart failure ■ preserved ejection fraction ■ prognosis ■ stroke

Atrial fibrillation (AFib) is the most common arrhythmia and is responsible for significant morbidity and mortality in patients with heart failure (HF) with reduced ejection fraction (HFrEF) or preserved ejection fraction (HFpEF).[1,2] There is a reciprocal relationship between HF and AFib in which HF predisposes to AFib and AFib worsens HF.[3–5] Much is known about the role of AFib in HFrEF but studies of AFib in HFpEF are more limited. Some recent clinical trial and observational studies have shown that AFib is present in ≤43% of patients with HFpEF and is perhaps more prevalent than in HFrEF.[2,3,5–8]

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Studies of patients with HFpEF have shown that the presence of AFib on an ECG is independently associated with a higher incidence of cardiovascular morbidity.[2,7]

Recent studies have indicated that periodic ECGs may miss several patients who are at risk from AFib.[9,10] A history of AFib may help identify some of these at-risk patients. The primary objective of this post hoc analysis of data from the Irbesartan in Heart Failure with Preserved Ejection Fraction Trial (I-PRESERVE) was to determine whether a history of AFib is an independent risk factor for stroke in patients with HFpEF.

Methods

Study Design and Patient Selection

I-PRESERVE is a randomized, placebo-controlled, double-blind, multicenter trial that enrolled subjects with symptomatic HFpEF to evaluate the efficacy of the angiotensin receptor blocker irbesartan.[11] Briefly, 4128 patients, ≥60 years with symptomatic (New York Heart Association class II–IV) HF with a left ventricular (LV) ejection

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fraction >45%, and ≥1 hospitalization for HF during the previous 6 months were eligible to be enrolled. Patients who had not been hospitalized were required to have ongoing class III or IV symptoms with corroborative evidence of HF, or a likely substrate for HFpEF, such as electrocardiographic or echocardiographic evidence of moderate or severe LV hypertrophy or left atrial enlargement in the absence of AFib. The primary end point of the study was the composite of all-cause mortality and protocol-specified cardiovascular hospitalizations. There were several secondary end points including all-cause mortality, cardiovascular death or HF hospitalization, and HF death or HF hospitalization (HF composite end point). Deaths and hospitalizations were adjudicated by a blinded independent end point committee, using prespecified criteria. Eligible patients were randomized to receive irbesartan or placebo in a 1:1 ratio stratified by site and use of an angiotensin-converting enzyme inhibitor at baseline. The study was approved by the institutional review board at each center, and all subjects provided a written informed consent.

This analysis focused on patients classified as at risk based on the history of AFib in the case report forms with or without AFib documented on the required baseline ECG. The following study outcomes were analyzed in these groups and compared with the group that had neither a history or ECG indicating AFib: fatal or nonfatal stroke, cardiovascular death or HF hospitalization, HF death or HF hospitalization, and all-cause mortality.

Statistical Analysis

The baseline characteristics of subjects with a history of AFib with or without AFib at baseline on their ECG and those without any indication of AFib were compared with each other using ANOVA for continuous variables or cross-tabulation for categorical variables with a Bonferroni correction for multiple pairwise comparisons when the overall *P* value was significant. Distributions of the natriuretic peptide levels were positively skewed and were transformed using logarithms for analysis. Unadjusted Kaplan–Meier curves are shown to describe the study outcomes in each group. Because the investigational medication, irbesartan did not have a significant effect on any of the study end points, all enrolled subjects were included in this analysis.

Cox regression analyses were used to estimate hazard ratios for each of the study outcomes for the 2 distinct groups with a history of AFib, those with or without AFib also present on their baseline ECG, as well as both of these groups combined compared with the group with no history or ECG record of having AFib. The 2 groups with a history of AFib were compared with each other by simply changing the reference group for the AFib group indicator variable in the Cox regression analyses. Because all but 18 (2.7%) of the 670 subjects that had AFib on their baseline ECG also had a history of AFib, we included these 18 patients whose history was most likely misclassified in the group with both a history of AFib and AFib on ECG. The results were not substantially different when these 18 subjects were excluded from all groups (not reported). Adjusted hazard ratios were estimated by multivariable Cox regression including age at baseline, sex, race, history of ischemic heart disease, chronic obstructive pulmonary disease, hypertension, hyperlipidemia, stroke, renal artery disease, diabetes mellitus, hospitalization for HF in previous 6 months, heart block, and other arrhythmias, chronic kidney disease, anemia, systolic blood pressure, LV hypertrophy on ECG, albumin, platelet count, and treatment with irbesartan, antiarrhythmic, antiplatelet agent, antithrombotic agent, calcium channel blocker, β-blocker, angiotensin-converting enzyme inhibitor, digoxin, diuretic, spironolactone, nitrate, lipid-lowering drugs, and an implantable cardioverter defibrillator/pacemaker. Several clinical variables that could be affected by the presence of ongoing AFib at baseline including pulmonary congestion on x-ray, rales, jugular venous distention, liver enlargement, New York Heart Association class, heart rate, and natriuretic peptide were not included in these multivariable regression analyses to avoid over adjustment for potential mediators of the effects of AFib on study outcomes. The proportional hazards assumption for each variable and outcome was examined using Schoenfeld residuals. Stata software version 12.1 was used for all analyses.

Results

Baseline Characteristics in Relation to AFib Indicators

A history of AFib was present in 29% (1209/4128) of the patients, and in approximately half of these (670/1209) AFib was documented on baseline ECG. There was no history or ECG documentation of AFib in 2901 of the 4128 patients.

Baseline characteristics of the 3 groups defined by AFib indicators are summarized in Table 1. The groups with or without AFib on their baseline ECG were similar except for several signs and symptoms of decompensated HF, cardiac rhythm disturbances, ischemic heart disease, and medications. Both groups with indicators of AFib differed from those without AFib on several variables.

Association Between Indicators of AFib and Outcomes

During a median follow-up of 53 months (interquartile range, 41–60 months), fatal or nonfatal stroke occurred in 5.7% (38/670) patients with history and AFib on ECG compared with 7.4% (41/557) with history of AFib alone and in 3.9% (114/2901) with no AFib (Figure [A]), cardiovascular death or HF hospitalization occurred in 45% (302/670) patients with history and AFib on ECG compared with 54% (298/557) with history of AFib alone and in 35% (1021/2901) with no AFib (Figure [B]); the HF death or HF hospitalization composite end point occurred in 29% (196/670) patients with history and AFib on ECG compared with 26% (146/557) with history of AFib alone and in 13% (367/2901) with no AFib (Figure [C]); 30% (203/670) patients with history and ECG evidence of AFib died from any cause compared with 28% (156/557) with history of AFib alone and 18% (515/2901) with no AFib (Figure [D]).

Table 2 shows the unadjusted and adjusted comparisons of study outcomes in AFib indicator groups. Except for a higher risk of HF hospitalizations or death in the group with AFib on baseline ECG, there were no significant differences in the outcomes between the 2 AFib groups defined by ECG. As shown in Table 1, the group with AFib on baseline ECG had more signs and symptoms of HF as expected and these variables were not included in the adjustment model (see Statistical Analysis section). The increased risk of stroke was significant and similar in the groups with or without AFib on the baseline ECG. Combining these 2 groups, the adjusted estimate of the increase in the risk of fatal or nonfatal stroke associated with a history of AFib was hazard ratio 2.2 (95% confidence interval, 1.6–3.2) compared with the group with no indication of AFib. A history of AFib was significantly associated with cardiovascular death or HF hospitalization, 1.2 (1.0–1.4) and HF death or HF hospitalization 1.3 (1.1–1.6) but not with all-cause mortality.

Discussion

In this analysis of I-PRESERVE we found that although 29% patients had a history of AFib at baseline, AFib was confirmed on ECG in only half (54%) of them (16% of total cohort), and the remaining patients (14% of the cohort) had a history of AFib alone. The presence of AFib on the baseline ECG did not increase the significant risk of stroke associated with a history of AFib. To the best of our knowledge this is the first report to

Table 1. Baseline Characteristics in Groups With and Without Indicators of Atrial Fibrillation

				P Value	
	None	History Only	History and ECG	Overall	AFib Groups*
No. of subjects	2901 (70%)	557 (14%)	670 (16%)	...	...
Age, mean (SD), y	71 (6.8)	73 (6.6)	74 (7.1)	<0.0001	NS
Men, n (%)	1091 (38)	238 (43)	308 (46)	<0.0001	NS
Nonwhite (%)	92	97	97	<0.0001	NS
Hypertension, n (%)	2609 (90)	480 (86)	561 (84)	<0.0001	NS
Diabetes mellitus, n (%)	785 (27)	159 (29)	182 (28)	0.73	ND
Hyperlipidemia, n (%)	1328 (46)	255 (46)	227 (34)	<0.0001	<0.0001
Ischemic heart disease, n (%)	1565 (54)	274 (50)	257 (39)	<0.0001	<0.0001
Stroke/TIA, n (%)	243 (8.4)	75 (14)	81 (12)	<0.0001	NS
Renal artery disease (%)	10.2	3.0	2.4	0.002	NS
COPD/asthma, n (%)	237 (8.2)	87 (16)	67 (10)	<0.0001	0.009
Valve disease, n (%)	216 (7.5)	109 (20)	126 (19)	<0.0001	NS
Other arrhythmia, n (%)	337 (12)	99 (18)	57 (8.5)	<0.0001	<0.0001
Heart block, n (%)	54 (1.9)	30 (5.4)	16 (2.4)	<0.0001	0.02
Pacemaker/ICD implanted, n (%)	102 (3.5)	91 (16)	71 (11)	<0.0001	0.04
HF admission in past 6 mo for HF, n (%)	1073 (37)	332 (60)	411 (62)	<0.0001	NS
Hypertensive HF etiology, n (%)	1933 (66.6)	320 (58)	359 (55)	<0.0001	NS
Ischemic HF etiology, n (%)	771 (27)	135 (24)	130 (19)	0.001	NS
Diastolic blood pressure, mean (SD), mm Hg	79 (8.9)	77 (9.5)	79 (9.4)	0.0003	NS
Systolic blood pressure, mean (SD), mm Hg	137 (14)	136 (17)	134 (15)	<0.0001	NS
Heart rate, mean (SD)	71 (9.8)	70 (11)	76 (12)	<0.0001	<0.0001
JVD, n (%)	204 (7.0)	39 (7.0)	103 (16)	<0.0001	<0.0001
Liver enlargement, n (%)	533 (18)	81 (14)	139 (21)	0.014	0.015
Rales, n (%)	790 (27)	142 (25)	226 (34)	0.002	0.006
Left ventricular hypertrophy, n (%)	938 (32)	163 (29)	159 (24)	<0.0001	NS
Left bundle-branch block, n (%)	244 (8.4)	48 (8.6)	44 (6.6)	0.28	ND
Pulmonary congestion on chest radiograph, n (%)	999 (36)	244 (45)	347 (54)	<0.0001	0.006
Left ventricle EF %, mean (SD)	60 (9.1)	59 (8.9)	58 (9.3)	<0.0001	NS
Left atrial area, cm^2, mean (SD)†	21.3 (5.0)	25.3 (6.6)	29.7 (6.3)	<0.0001	<0.0001
eGFR, mean (SD), mL/min	74 (22)	69 (23)	69 (21)	<0.0001	NS
CKD, n (%)	795 (27.7)	219 (40.0)	229 (35.7)	<0.0001	NS
NT-proBNP, median (IQR), pg/mL	230 (104–538)	534 (232–1118)	1319 (776–2062)	<0.0001	<0.0001
Irbesartan, n (%)	1455 (50)	267 (48)	345 (51)	0.37	ND
ACE inhibitor, n (%)	696 (24)	154 (28)	183 (27)	0.08	ND
Antiplatelet, n (%)	1893 (65)	294 (53)	229 (34)	<0.0001	<0.0001
Antiarrhythmic, n (%)	99 (3.4)	178 (32)	82 (12)	<0.0001	<0.0001
Anticoagulant, n (%)	128 (4.4)	230 (41)	432 (64)	<0.0001	<0.0001
β-blocker, n (%)	1714 (59)	321 (58)	392 (58)	0.80	ND
Calcium channel blocker, n (%)	1221 (42)	194 (35)	222 (33)	<0.0001	NS
Diuretic, n (%)	2307 (80)	485 (87)	626 (93)	<0.0001	<0.0001
Lipid lowering, n (%)	936 (32)	174 (31)	169 (25)	0.002	NS
Digoxin, n (%)	131 (4.5)	108 (19)	322 (48)	<0.0001	<0.0001
Nitrate, n (%)	828 (29)	134 (24)	146 (22)	0.001	NS
Spironolactone, n (%)	358 (12)	110 (20)	165 (25)	<0.0001	NS

ACE indicates angiotensin-converting enzyme; AFib, atrial fibrillation; COPD, chronic obstructive pulmonary disease; CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; EF, ejection fraction; HF, heart failure; ICD, implantable cardioverter defibrillator; IQR, interquartile range; JVD, jugular venous distension; ND, not done because overall not significant; NS, not significant with Bonferroni correction for possible 3 pairwise comparisons; NT-proBNP, N-terminal pro B natriuretic peptide; and TIA, transient ischemic attack.

*Comparing the 2 groups that did or did not have AFib on baseline ECG if overall ANOVA *P* value was <0.01.

†Left atrial area was measured in 696 subjects only.

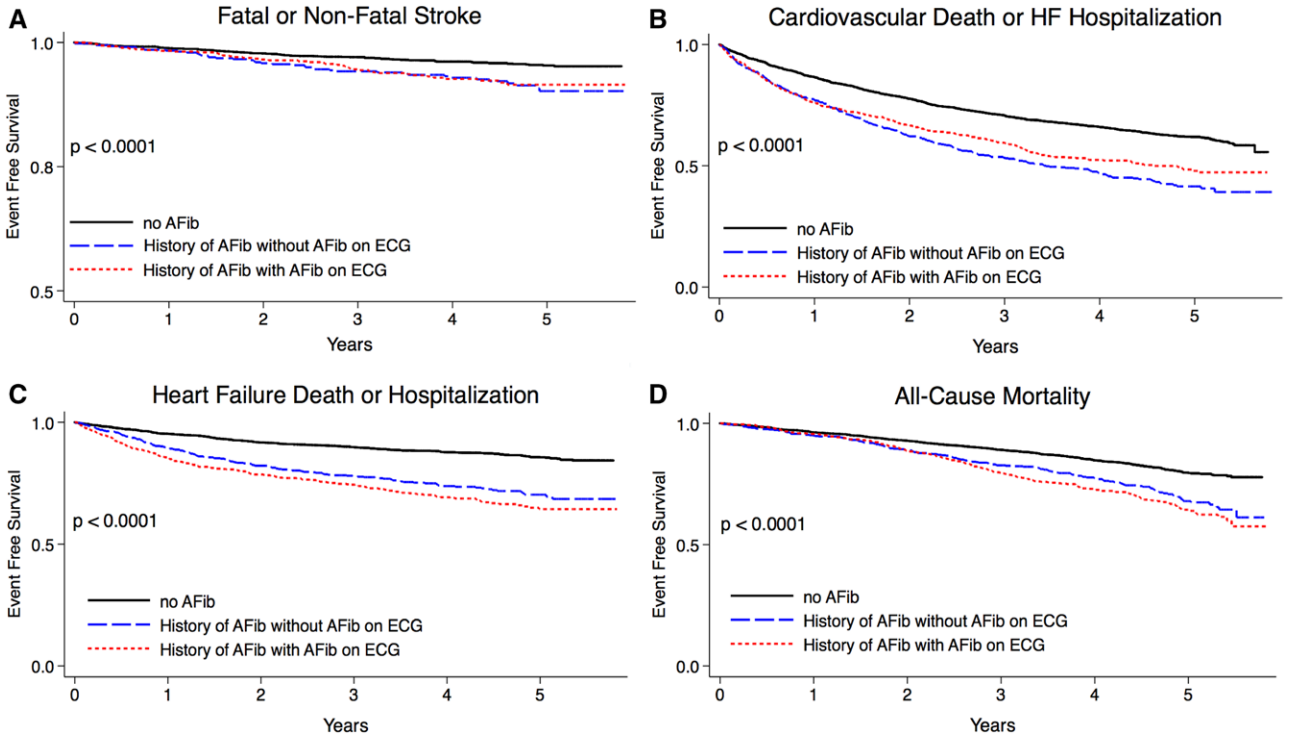

Figure. Kaplan–Meier curves for time to fatal or nonfatal stroke (**A**), cardiovascular death or heart failure (HF) hospitalization (**B**), HF death or HF hospitalization (**C**), and all-cause mortality (**D**) in groups defined by a history of atrial fibrillation (AFib), a history of AFib confirmed by ECG or no indication of AFib.

highlight this finding in patients with HFpEF. Although the risk associated with AFib on ECG in patients with HFpEF has been examined previously,[2,7,12–15] this analysis indicates that a history of AFib is also associated with an increased risk of cardiovascular morbidity and mortality, including stroke. These results, therefore, suggest that a history of AFib should be taken into consideration when assessing the risks of AFib in patients with HFpEF regardless of whether AFib is present on ECG.

Although it is well known that AFib increases the risk of ischemic stroke in patients with HFrEF, only a few recent studies have reported that the risk of stroke is also increased in patients with HFpEF.[2,7,12–14,16] Studies have compared the risk of stroke in patients with AFib and HFrEF or HFpEF. A subgroup analysis of the AFib Follow up Investigation of Rhythm Management (AFFIRM) trial found that although the history of stroke was more prevalent in patients with HFpEF compared with HFrEF at baseline (16% versus 11%), the subsequent incidence of stroke during the study was no different between the groups.[17] The Candesartan in Heart failure-Assessment of Reduction in Mortality and morbidity (CHARM) study also did not find a difference in the incidence of stroke in patients with AFib with either HFrEF or HFpEF.[7] In patients with preexisting AFib, McManus et al[2] reported a 91% higher risk of ischemic stroke in HFpEF and only 7% higher risk in HFrEF compared with those without AFib. The most recent data come from the post hoc analyses of the new oral anticoagulant trials such as ARISTOTLE (Apixaban for Reduction in Stroke and Other Thromboembolic Events in Atrial Fibrillation Trial),[12] ROCKET (Rivaroxaban Once daily oral direct factor Xa inhibition Compared with vitamin K antagonism for prevention of stroke and Embolism Trial in atrial fibrillation),[13] and RE-LY (Randomized Evaluation of Long-term anticoagulation therapY with dabigatran etexilate).[14] These studies show that although the risk of stroke or systemic embolism was significantly higher in patients with a diagnosis of HF compared with those with no HF, the risk of stroke or systemic embolism was no different in patients with HF with preserved or reduced ejection fraction. These data suggest that the risk of stroke in patients with AFib and HFpEF is at least as high as those in patients with AFib and HFrEF and that the guidelines should specifically emphasize the inclusion of all patients with HF in the CHADS2 (congestive HF, hypertension, age, diabetes mellitus, and prior stroke or transient ischemic attack) and CHA2DS2-VASc scoring system, irrespective of the ejection fraction. Furthermore, our data suggest that the same guidelines should also apply to patients with HFpEF even when they only have a history of AFib that is not confirmed on ECG.

The original $CHADS_2$ score designed to help estimate the risk of stroke and need of anticoagulation in patients with nonvalvular AFib was based on studies in patients with HF with LV dysfunction.[18] Accordingly, the 2006 and 2011 American College of Cardiology/American Heart Association/Heart Rhythm Society AFib clinical practice guidelines recommended the use of $CHADS_2$ score as a guide to anticoagulation of patients with AFib and HF with impaired LV systolic function but did not mention HFpEF.[19,20] The most recent European Society of Cardiology AFib 2012 guidelines recommend the use of CHA_2DS_2-VASc instead of the $CHADS_2$ score and define HF as documented moderate-to-severe systolic dysfunction or patients with recent decompensated heart failure requiring hospitalization, irrespective of ejection fraction but do not include stable patients with HFpEF.[21] The 2 most recent HF guidelines also do not specifically mention HFpEF. The

Table 2. Comparison of Outcomes in Atrial Fibrillation Indicator Groups

Outcome	Unadjusted HR (95% CI; n=4128)	Adjusted* HR (95% CI; n=3942)
Fatal or nonfatal stroke		
History of AFib without AFib on ECG	1.00 (reference group)	1.00 (reference group)
History of AFib with AFib on ECG	0.94 (0.62–1.44)	1.16 (0.72–1.86)
No AFib on history or baseline ECG	1.00 (reference group)	1.00 (reference group)
History of AFib without AFib on ECG	1.97 (1.38–2.81)	2.12 (1.40–3.21)†
History of AFib with AFib on ECG	1.85 (1.31–2.61)	2.45 (1.54–3.92)†
Combined groups with history of AFib	1.90 (1.44–2.52)†	2.24 (1.55–3.24)†
CV death/HF hospitalization		
History of AFib without AFib on ECG	1.00 (reference group)	1.00 (reference group)
History of AFib with AFib on ECG	0.86 (0.73–1.00)	0.92 (0.76–1.09)
No AFib on history or baseline ECG	1.00 (reference group)	1.00 (reference group)
History of AFib without AFib on ECG	1.81 (1.59–2.06)†	1.23 (1.05–1.44)‡
History of AFib with AFib on ECG	1.55 (1.36–1.76)†	1.13 (0.94–1.34)
Combined groups with history of AFib	1.67 (1.51–1.84)†	1.19 (1.03–1.37)‡
HF death/HF hospitalization		
History of AFib without AFib on ECG	1.00 (reference group)	1.00 (reference group)
History of AFib with AFib on ECG	1.23 (0.99–1.52)	1.28 (1.01–1.64)‡
No AFib on history or baseline ECG	1.00 (reference group)	1.00 (reference group)
History of AFib without AFib on ECG	2.29 (1.89–2.78)†	1.18 (0.93–1.50)
History of AFib with AFib on ECG	2.82 (2.37–3.35)†	1.51 (1.19–1.92)‡
Combined groups with history of AFib	2.57 (2.22–2.98)†	1.32 (1.08–1.63)‡
All-cause mortality		
History of AFib without AFib on ECG	1.00 (reference group)	1.00 (reference group)
History of AFib with AFib on ECG	1.18 (0.96–1.45)	1.14 (0.90–1.44)
No AFib on history or baseline ECG	1.00 (reference group)	1.00 (reference group)
History of AFib without AFib on ECG	1.66 (1.39–1.98)†	1.07 (0.86–1.34)
History of AFib with AFib on ECG	1.95 (1.66–2.29)†	1.23 (0.99–1.54)
Combined groups with history of AFib	1.82 (1.59–2.06)†	1.15 (0.95–1.38)

AFib indicates atrial fibrillation; CI, confidence interval; CV death, cardiovascular death; HF, heart failure; and HR, hazard ratio.

*Adjusted for age, sex, race, history of ischemic heart disease, renal artery disease, chronic obstructive pulmonary disease, hypertension, hyperlipidemia, stroke, diabetes mellitus, HF hospitalization in past 6 months, heart block, other arrhythmias, chronic kidney disease, anemia, systolic blood pressure, left ventricular hypertrophy (ECG), albumin, platelets, treatment with irbesartan, antiarrhythmic, antiplatelet, antithrombotic, calcium channel blocker, β-blocker, angiotensin-converting enzyme inhibitor, digoxin, diuretic, spironolactone, nitrate, lipid-lowering drugs, implantable cardioverter defibrillator, and pacemaker.

†$P<0.001$; ‡ $P<0.01$.

2012 European Society of Cardiology HF guideline endorses thromboembolic prophylaxis in patients with HF and AFib based on the CHA_2DS_2-VASc score, defining HF as congestive HF or LV ejection fraction <40%,[22] and the most recent, 2013 American College of Cardiology Foundation/American Heart Association HF guideline recommends the use of anticoagulant in patients with chronic heart failure with permanent, persistent, or paroxysmal AF and an additional risk for cardioembolic stroke.[1] Hence, although the intent of the guidelines might have been to include all patients with HF irrespective of LV ejection fraction, the written document may be ambiguous and clinicians may not be entirely clear on this issue.

Strengths and Limitations

This analysis is based on the largest randomized clinical trial of well-characterized patients with HFpEF where all outcomes were adjudicated. In addition, we were able to examine AFib separately by history alone and AFib confirmed by ECG along with several established prognostic variables, including comorbidities, clinical examination and laboratory data, and medication use. However, this is a secondary analysis of data from a randomized controlled trial and some of the findings may be spurious although the results are consistent with previous studies. The results may not be widely applicable. For example, I-PRESERVE subjects with HFpEF were predominantly white and the results may not be generalizable to other racial groups. The presence of AFib was assessed at baseline by a single ECG. However, this limitation is unlikely to change our conclusions because the outcomes were similar in those with history of AFib not confirmed on ECG. Indeed, a history of AFib seemed to be sufficient to increase the risk and captured nearly all of the patients with AFib on ECG. Because

we did not have data on patients with HFrEF including sets of covariates, comparisons of the different types of HF could not be made as some previous studies have done.

In conclusion, in this sample of patients with HFpEF, a history of AFib was common and independently associated with increased risk of fatal or nonfatal stroke. The presence of AFib on ECG did not significantly heighten the risk. Patients with HFpEF and a history of AFib should be considered at risk of stroke, and HFpEF should be included as a risk factor in stroke prediction models for patients with AFib. Future studies are needed to determine whether this risk can be safely reduced.

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Disclosures

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CLINICAL PERSPECTIVE

Atrial fibrillation (AFib) is common in patients with heart failure (HF) and reduced or preserved ejection fraction. The current AFib stroke risk prediction guidelines include the presence of HF but do not specifically mention HF with preserved ejection fraction as a risk factor. Moreover, most risk assessment studies have used ECG to identify patients with AFib. Whether a history of AFib should also be used to identify patients with HF with preserved ejection fraction who are at risk from AFib has not been established. Our analysis of the 4128 patients in Irbesartan in Heart Failure with Preserved Ejection Fraction Trial (I-PRESERVE) showed that 29% of the patients had a history of AFib, whereas only 16% had both a history and AFib on ECG. There were no significant differences in the risk of stroke between the 2 groups with a history of AFib. A history of AFib was independently associated with >2-fold increase in the risk of stroke, regardless of whether AFib was present on ECG. Patients with HF with preserved ejection fraction and a history of AFib should be considered at risk. Further studies are needed to determine whether this risk can be safely reduced.

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History of Atrial Fibrillation as a Risk Factor in Patients With Heart Failure and Preserved Ejection Fraction

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