Atrial Fibrillation among African Americans, Hispanics and Caucasians: Clinical Features and Outcomes from the AFFIRM Trial

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The Atrial Fibrillation Follow-Up Investigation of Rhythm Management (AFFIRM) study concluded that rate control with anticoagulation was equivalent overall to rhythm control with cardioversion for long-term survival and that anticoagulation reduced the risk of stroke. We compared baseline and follow-up data for three ethnic groups: Caucasians (n=3,599), African Americans (n=265) and Hispanics (n=132). Caucasians were older and more likely male, African Americans were more likely female and hypertensive, and Hispanics had higher prevalence of cardiomyopathy. Survival was better for rate control than rhythm control in Caucasians, equivalent in African Americans and better for rhythm control in Hispanics. Outcomes may be influenced by differential baseline characteristics, but low numbers of African Americans and Hispanics warrant caution in data interpretation.

Background: The AFFIRM study compared a rate-control strategy to a rhythm-control strategy for the treatment of atrial fibrillation (AF) in patients at high risk for stroke or death. It concluded that the rhythm-control strategy offered no survival advantage, and it also confirmed the value of anticoagulation to prevent complications of AF. Data have not previously been available for specific racial ethnic populations.

Methods: We compared baseline and follow-up data for the patients randomized to rate-control versus rhythm-control in three population groups–Caucasian, African-American and Hispanic.

Results: Among 4,060 total patients, 3,599 were Caucasian, 265 were African-American and 132 were Hispanic. At baseline, Caucasians were older and had a higher percentage of males, normal ejection fractions, AF as their only cardiac diagnosis, a prior antiarrhythmic drug failure and less congestive heart failure. African Americans were more likely to be female, had more hypertension and qualified for the study with a first episode of AF, compared to Caucasians. Hispanics had more cardiomyopathy at baseline than Caucasians.

Overall survival in Caucasians at five years for the rate-control and rhythm-control groups was 78.9% vs. 76.4%, respectively (p=0.04); for African Americans, 79.0% vs. 69.4% (p=0.22); and for Hispanics, 66.5% vs. 83.9% (p=0.01). Overall, survival was not different between the three populations. However, lower rates of event-free survival were recorded for Hispanics and for African Americans (p=0.0182).

Conclusions: Different survival rates were found for rate-control versus rhythm-control in African-American and Hispanic patients, compared to Caucasian. These findings may be influenced by differences in baseline characteristics, but must be interpreted with caution because of the small sample sizes for African-American and Hispanic participants.

Key words: atrial fibrillation ■ minority ■ ethnicity ■ Caucasians ■ African Americans ■ Hispanics

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INTRODUCTION

Atrial fibrillation (AF) is a common condition that affects an estimated 2.2 million individuals in the United States.[1] Variations in the incidence and complications from AF have been observed by age, gender and race.[1-3] However, the overall spectrum of AF, including treatment responses and clinical outcome in randomized trials has not been well studied or reported in minority populations. The aging of the population is associated with an increased preva-

lence of AF, which is responsible for approximately 15% of all strokes, and among individuals over the age of 80, for nearly 35% of all strokes.[4] As the percentage of minorities is also increasing, data on population subgroups are clearly needed.

Higher rates of stroke and higher mortality and morbidity from cardiovascular disease are observed in African Americans compared to Caucasians.[5-9] African Americans also have higher rates of cardiac risk factors, including hypertension, diabetes mellitus and obesity.[10] In contrast, Hispanics age >65, despite having higher rates of diabetes mellitus, smoking and obesity than Caucasians, have lower rates of stroke.[11] However, it is not clear that the difference in observed outcomes between minority and nonminority populations can be explained solely on differences in the prevalence of risk factors.[12-14]

Anticoagulation with warfarin significantly reduces the rate of stroke in patients with AF.[15] However, anticoagulation is often underutilized among both elderly and minority patients.[16] Thus, it might be anticipated that minority patients with AF would have higher rates of stroke and other adverse events. Paradoxically, some studies have reported that African Americans have lower prevalence of, and mortality from, AF than do Caucasians. A recent study of individuals aged 50 and older found the prevalence of AF to be significantly higher among Caucasians than African Americans (2.2% vs. 1.5%, p<0.001).[3] Moreover, lower mortality due to AF has been reported among African Americans than in Caucasians.[2]

The Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) study compared clinical outcomes in patients with AF who were managed either with a strategy of maintaining sinus rhythm or of maintaining control of the ventricular rate, both strategies using anticoagulation, although anticoagulation could be withdrawn in successful rhythm-control patients.[17,18] Patients enrolled in the study had at least a moderate risk of stroke or death by virtue of age ≥65 years or having other clinical risk factors. Since it has not been established in patients with AF whether the prevalence of risk factors or clinical outcomes differ for minority patients compared to the general population, we examined the AFFIRM database and compared baseline characteristics and outcomes of African Americans and Hispanics to Caucasians.

Table 1. Patient characteristics

	Caucasians	African Americans	Hispanics	P Value, African Americans vs. Caucasians	P Value, Hispanics vs. Caucasians
N (%)	3,599 (90.1)	265 (6.6)	132 (3.3)		
Age ± SD	70.3 ± 8.7	65.7 ± 10.0	65.2 ± 9.1	<0.0001	<0.0001
Female gender	1,370 (38.1)	142 (53.6)	53 (40.2)	<0.001	0.63
Primary Diagnosis					
Coronary artery disease	967 (26.9)	49 (18.5)	34 (25.8)	0.003	0.78
Cardiomyopathy	163 (4.5)	15 (5.7)	12 (9.1)	0.40	0.01
Hypertension	1,775 (49.3)	181 (68.3)	69 (52.3)	<0.001	0.51
Valvular heart disease	178 (5.0)	10 (3.8)	6 (4.6)	0.39	0.83
Other	36 (1.0)	3 (1.1)	2 (1.5)	0.75	0.39
None apparent	480 (13.3)	7 (2.6)	9 (6.8)	<0.0001	0.03
History of CHF	789 (21.9)	96 (36.2)	45 (34.1)	<0.0001	0.001
Duration of Qualifying AF Episode					
<2 days	1,126 (31.3)	78 (29.4)	28 (21.2)	0.53	0.01
≥2 days	2,472 (68.7)	187 (70.6)	104 (78.8)	0.53	0.01
First episode of AF	1,126 (31.3)	123 (49.8)	49 (38.0)	<0.0001	0.41
Prior antiarrhythmic drug failure	662 (18.4)	30 (11.3)	10 (7.6)	0.004	0.002
Normal LA size	980 (35.3)	68 (33.8)	31 (31.3)	0.67	0.41
LVEF					
Normal	2,023 (68.9)	122 (57.0)	60 (55.6)	0.0001	0.02
Mild abnormality	345 (11.8)	25 (11.7)	16 (14.8)		
Moderate abnormality	203 (6.9)	23 (10.8)	13 (12.0)		
Severe abnormality	127 (4.3)	18 (8.4)	8 (7.4)		
Unknown	237 (8.1)	26 (12.2)	11 (10.2)		

N (%); AF: atrial fibrillation; LA: left atrial; LVEF: left ventricular ejection fraction; SD: standard deviation

METHODS

For this substudy, we compared self-identified African Americans, Hispanics and Caucasians with respect to baseline demographic characteristics, risk indicators and outcome. The baseline characteristics considered were race, age at entry, gender, primary cardiac diagnosis, clinical history, selected items from the physical examination, left atrial size, left ventricular size and function and treatment arm. Clinical outcomes between the subgroups were compared, including measures of morbidity, mortality, change of treatment group and success of rhythm-control or rate-control therapies. An outcome event was defined as death, stroke, anoxic encephalopathy, major bleed (gastrointestinal, etc., requiring therapy) or cardiac arrest.

STATISTICAL ANALYSIS

Baseline characteristics of patients and point prevalence data were compared using Chi-squared, Fisher's exact test or t test statistics. Kaplan-Meier analyses and log-rank tests were used to compare time to endpoint events between the groups. All endpoint events were analyzed by intention-to-treat assignment. P values <0.05 were considered to be significant.

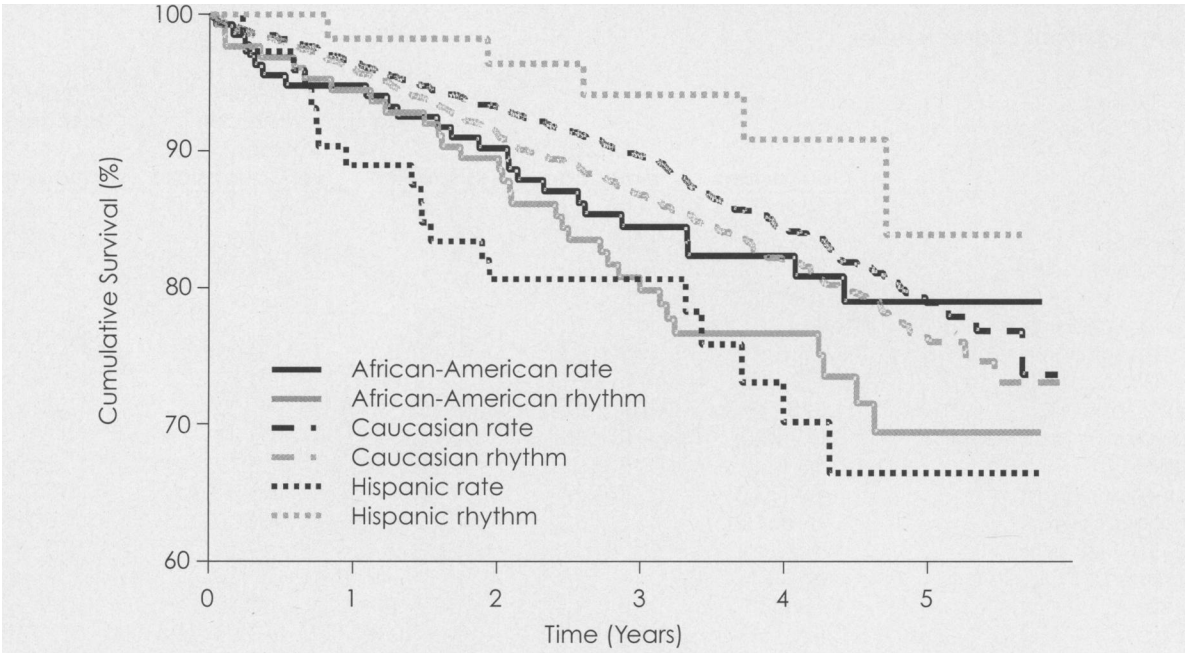
RESULTS

Four-thousand-sixty patients were enrolled in the AFFIRM study. In Table 1, this report describes the 3,996 patients who were classified as Caucasians (3,599, 90.1%), African Americans (265, 6.6%) and Hispanics (132, 3.3%). The remaining 64 patients were either Asian Americans, Native Americans or undesignated.

Baseline Differences

African Americans versus Caucasians. African Americans were younger than Caucasians (65.7 years vs. 70.3 years, $p<0.0001$) and had a higher percentage of females (53.6% vs. 38.1%, $p<0.0001$). African Americans were more likely to have a cardiac diagnosis of hypertension (68.3% vs. 49.3%, $p<0.0001$) and

Figure 1. Prevalence of sinus rhythm in Caucasians, African Americans and Hispanics



N, Cumulative Events (%)

AA rate:	137, 0 (100)	125, 7 (95)	118, 13 (90)	88, 20 (84)	59, 22 (82)	22, 24 (79)
AA rhythm:	128, 0 (100)	115, 7 (94)	107, 13 (90)	82, 24 (80)	58, 27 (77)	25, 31 (69)
C rate:	1,786, 0 (100)	1,709, 62 (97)	1,626, 120 (93)	1,180, 175 (90)	680, 233 (84)	203, 261 (79)
C rhythm:	1,813, 0 (100)	1,727, 72 (96)	1,616, 158 (91)	1,173, 227 (87)	689, 279 (82)	219, 311 (76)
H rate:	75, 0 (100)	64, 8 (89)	57, 14 (81)	40, 14 (81)	23, 18 (70)	7, 19 (66)
H rhythm:	57, 0 (100)	55, 1 (98)	51, 2 (96)	37, 3 (94)	21, 4 (91)	8, 5 (84)

less likely to have a predominant cardiac diagnosis of coronary artery disease (18.5% vs. 26.9%, p=0.003) or no apparent cardiac diagnosis other than AF (lone AF, 2.6% vs. 13.3%, p<0.0001). A history of congestive heart failure was more common among African Americans (36.2% vs. 21.9%, p<0.0001). The proportion of African Americans with normal left ventricular ejection fraction was significantly lower than in Caucasians (64.9% vs. 75.0%, p=0.002, Table 1). Significantly more African Americans were enrolled in the trial with their first episode of AF (49.8% vs. 31.3%, p<0.001); they were less likely to have had a prior antiarrhythmic drug failure prior to randomization (11.3% vs. 18.4%, p=0.004). However, the percentage of patients with normal left atrial size was not significantly different (33.8% vs. 35.3%, p=NS, Table 1).

Hispanics versus Caucasians. Hispanics enrolled in AFFIRM were significantly younger than Caucasians (65.2 vs. 70.3%, p<0.0001). Hispanics were more likely to carry a predominant cardiac diagnosis of cardiomyopathy (9.1% vs. 4.5%, p=0.01) and less likely to have no apparent cardiac diagnosis other than AF (6.8% vs. 13.3%, p=0.03). A history of heart failure was more common among Hispanics (34.1% vs. 21.9%, p=0.001), and Hispanics were less likely to have normal ejection fractions (61.9% vs. 75.0%, p=0.004). The episode of AF that served as the qualifying episode for the trial was more likely to last for a period of time greater than 48 hours in Hispanics, compared to Caucasians (78.8% vs. 68.7%, p=0.01). Hispanics were less likely to have a history of an antiarrhythmic drug failure (7.6% vs. 18.4%, p=0.002, Table 1).

Differences in Follow-Up Drug Therapy

African Americans versus Caucasians. There were no differences between African Americans and Caucasians in the rate-control group with regard to the use of beta-blockers or calcium channel block-

Table 2. Warfarin use in Caucasians, African Americans and Hispanics

Warfarin Use	Rate-Control Group (n=1,786, 49.6%)	Rhythm-Control Group (n=1,813, 50.4%)	P Value
Caucasians			
Baseline	1,513 (84.7)	1,540 (84.9)	0.85
2 months	1,681 (97.6)	1,678 (96.0)	0.009
4 months	1,646 (96.0)	1,562 (90.3)	<0.0001
1 year	1,526 (92.5)	1,260 (75.9)	<0.0001
2 years	1,419 (91.5)	1,091 (70.3)	<0.0001
3 years	1,010 (90.5)	764 (68.8)	<0.0001
4 years	594 (90.3)	462 (70.3)	<0.0001
5 years	189 (87.1)	166 (69.8)	<0.0001
Warfarin Use	**Rate-Control Group (n=137, 51.7%)**	**Rhythm-Control Group (n=128, 48.3%)**	**P Value**
African Americans			
Baseline	111 (81.0)	109 (85.2)	0.37
2 months	116 (92.1)	111 (96.5)	0.14
4 months	110 (88.0)	104 (90.4)	0.54
1 year	102 (87.9)	84 (78.5)	0.06
2 years	89 (85.6)	69 (76.7)	0.11
3 years	58 (84.1)	49 (67.1)	0.02
4 years	42 (84.0)	30 (60.0)	0.008
5 years	18 (85.7)	13 (61.9)	0.08
Warfarin Use	**Rate-Control Group (n=75, 56.8%)**	**Rhythm-Control Group (n=57, 43.2%)**	**P Value**
Hispanics			
Baseline	59 (78.7)	47 (82.5)	0.59
2 months	59 (89.4)	47 (90.4)	0.86
4 months	58 (87.9)	49 (89.1)	0.84
1 year	50 (84.8)	35 (71.4)	0.09
2 years	43 (89.6)	30 (66.7)	0.007
3 years	26 (96.3)	22 (66.7)	0.004
4 years	16 (80.0)	14 (82.4)	>0.99
5 years	4 (66.7)	5 (71.4)	>0.99

N (%)

ers. The proportion of subjects in the rate-control arm achieving successful rate control was significantly less at three and four years of follow-up for African Americans, compared to Caucasians (p=0.05 at three years, p=0.003 at four years); however, this difference was not seen at the five other time points analyzed (Figure 1).

The drugs used in the rhythm-control arm were similar for African Americans and Caucasians (Table 3), including in order of frequency of use: amiodarone, sotalol, propafenone, procainamide, quinidine, flecainide and moricizine. Disopyramide was more commonly used as initial therapy in African Americans (5.5% vs. 2.1%, p=0.04).

Warfarin use was similar between groups with decreasing use of it over time in the rhythm-control arm, compared to the rate-control arm (Table 2).

Hispanics versus Caucasians. Among subjects in the rate-control arm, Hispanics were more likely than Caucasians to be taking digoxin as initial therapy (68.1% vs. 49.8%, p=0.002). There were no differences between Hispanics and Caucasians in the rate-control group with regard to the use of beta-blockers or calcium channel blockers. Compared to Caucasians, Hispanics during follow-up did not have significantly different rates of successful rate control (Table 2). There was no difference between groups with regard to initial antiarrhythmic therapy.

Warfarin use was similar between groups with deceasing use of warfarin seen over time in the rhythm-control arm compared to the rate-control arm (Table 2).

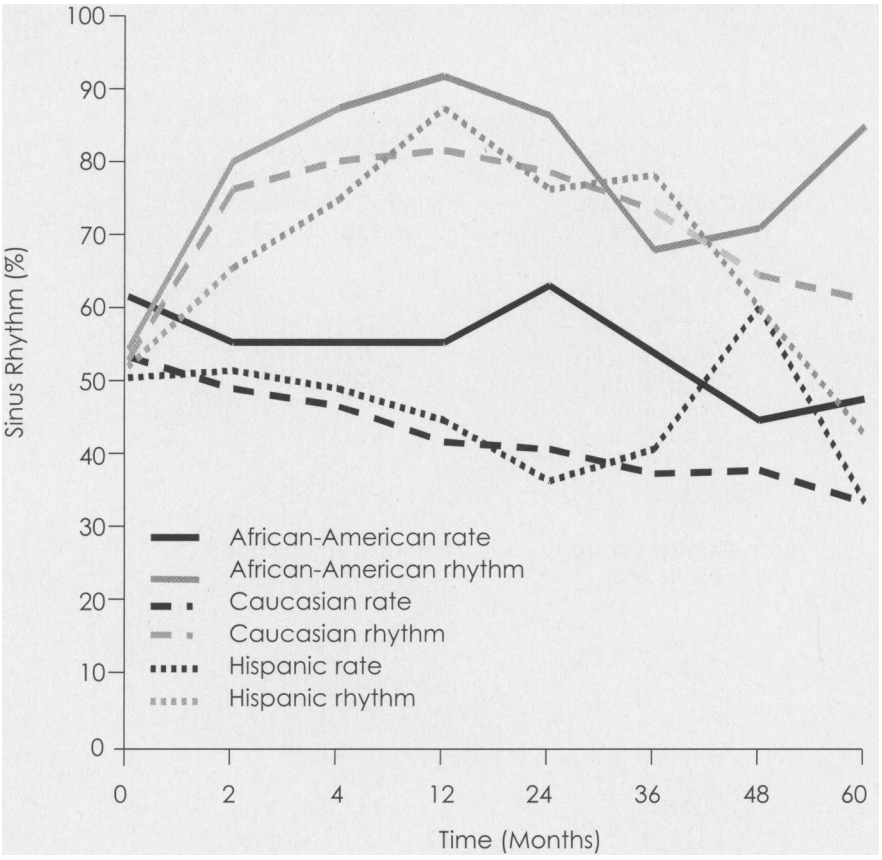
Survival

We compared overall survival rates for the three race/ethnic groups; however, there are insufficient numbers in the smaller ethnic groups to set up adjusted survival analyses (Cox models). Figure 3 demonstrates that the overall survival rates did not differ for African Americans, Hispanics and Caucasians. Figure 4 demonstrates a significant difference for event-free survival curves between the groups with Caucasian survival rates higher than Hispanic and, worst of all, African-American over the study period (p=0.0182).

Outcome Differences

A significantly higher prevalence of sinus rhythm was found in patients assigned to the rhythm-control

Figure 2. Survival in Caucasians, African-Americans and Hispanics



arm, compared to the rate-control arm in Caucasians, African Americans and Hispanics (Figure 1).

Caucasians. Overall survival in Caucasians was somewhat lower in the rhythm-control than in the rate-control group (76.4% vs. 78.9%, p=0.04, Figure 2). In Caucasians, event-free survival was not significantly different between the treatment arms (83.6% in rhythm vs. 85.3% in rate at three years, p=0.2945). Among Caucasians, death, torsade de pointes ventricular tachycardia, resuscitated cardiac arrest and frequency of hospitalizations after baseline were all significantly better for rate-control vs. rhythm-control patients (Table 3).

African Americans. In African Americans, overall survival did not differ significantly between the rhythm-control and rate-control groups (69.4% vs. 79.0% at five years, p=0.22, Figure 2). Event-free survival in African Americans likewise did not differ significantly between treatment arms (71.4% in rhythm vs. 79.1% in rate at three years, p=0.1456). None of the recorded adverse events differed significantly between rate control and rhythm control for African Americans, including ischemic stroke and cerebral hemorrhage, despite a tendency for rhythm-control patients to fare worse (Table 3).

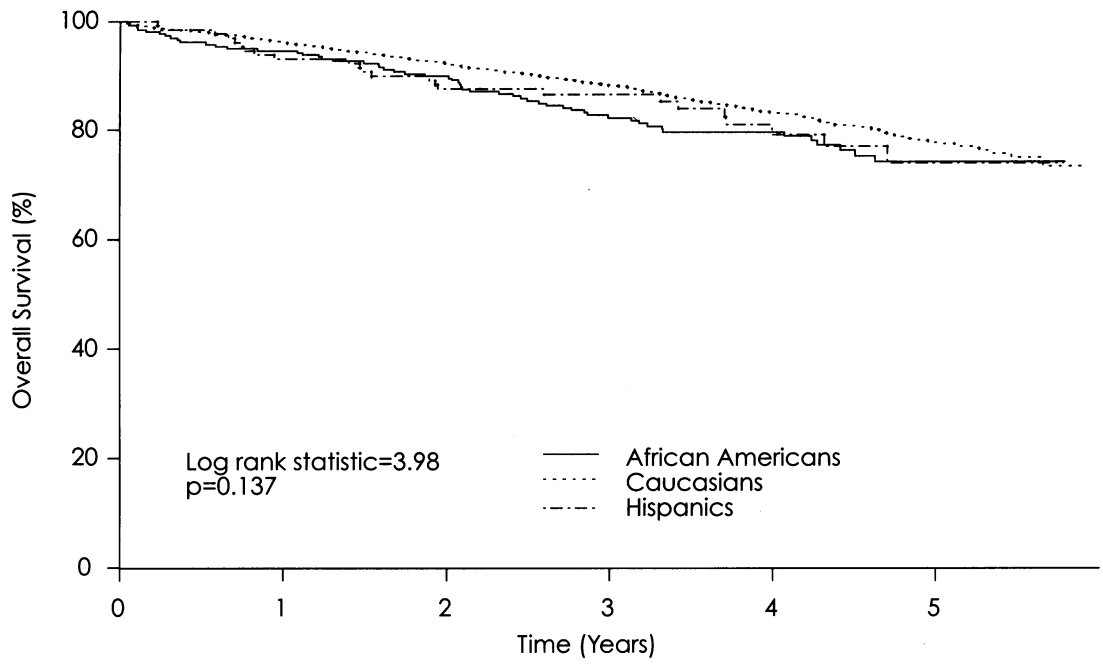
Hispanics. Overall survival in Hispanics was significantly greater in the rhythm-control than in the rate-control group (83.9% vs. 66.5% at five years, p=0.01, Figure 2). Event-free survival in Hispanics was significantly greater in the rhythm-control than in the rate-control group (86.8% vs. 76.5% at three years, p=0.0382). For Hispanics, both death and the composite endpoint of death, disabling stroke, disabling anoxic encephalopathy, major bleeding and cardiac arrest were significantly better in the rhythm-control arm (Table 3).

DISCUSSION

The AFFIRM study evaluated the comparative benefits of maintaining sinus rhythm after the onset of AF, versus remaining in AF with effective rate control plus continued anticoagulation.The overall study found no mortality benefit of one strategy versus the other, though patients in the rhythm-control arm had more frequent hospitalizations and nonfatal adverse events.[17,18]

Although several studies have documented that African Americans are less likely than Caucasians to develop AF with advancing age,[3,19] data have not been available to assess the consequences of having AF or the relative benefits of available therapy in either African-American or Hispanic populations.[20] It is

Figure 3. Overall survival for race/ethnic groups



N, Events (%)

AAs:	265, 0 (100)	240, 14 (94.6)	225, 26 (89.9)	170, 44 (82.2)	117, 49 (79.6)	47, 55 (74.2)
Caucasians:	3,599, 0 (100)	3,436, 134 (96.3)	3,242, 278 (92.2)	2,353, 402 (88.2)	1,369, 512 (83.2)	422, 572 (77.7)
Hispanics:	132, 0 (100)	119, 9 (93)	108, 16 (87.5)	77, 17 (86.5)	44, 22 (79.2)	15, 24 (74)

therefore of interest to compare the available data for African Americans and Hispanics to that of the majority Caucasian participants in the AFFIRM database.

Consistent with the known higher risk for heart disease, stroke and sudden death in African Americans, the baseline data in AFFIRM document multi-

Table 3. Adverse Events in Caucasians, African Americans and Hispanics

Adverse Event	Totals	Rate Control*	Rhythm Control*	P Value*
Caucasians				
Death	580 (26.6)	265 (26.3)	315 (26.9)	0.04
Composite endpoint of death, disabling stroke, disabling anoxic encephalopathy, major bleeding, cardiac arrest	746 (32.5)	356 (32.9)	390 (32.1)	0.26
Torsades de pointes VT	12 (0.5)	1 (0.1)	11 (0.8)	0.004
Sustained VT	11 (0.6)	6 (0.6)	5 (0.5)	0.76
Resuscitated cardiac arrest: VF, VT	17 (0.6)	10 (0.8)	7 (0.4)	0.46
Resuscitated cardiac arrest: PEA, bradycardia or other	9 (0.3)	1 (0.06)	8 (0.5)	0.02
Total number of patients with a CNS event	181 (8.1)	91 (7.3)	90 (8.8)	0.93
Ischemic stroke	132 (6.1)	66 (5.4)	66 (6.8)	0.98
Patient not taking warfarin	58	22	36	
Patient taking warfarin but INR <2.0	34	20	14	
In AF at time of event	58	36	22	
Primary intracerebral hemorrhage	29 (1.2)	16 (1.1)	13 (1.3)	0.57
Subdural/subarachnoid hemorrhage	22 (0.9)	9 (0.8)	13 (0.9)	0.40
Disabling anoxic encephalopathy	6 (0.2)	4 (0.2)	2 (0.1)	0.41
Myocardial infarction	130 (5.8)	61 (5.2)	69 (6.4)	0.50
Non-CNS hemorrhage	177 (7.3)	94 (7.9)	83 (6.8)	0.38
Systemic embolism	11 (0.4)	5 (0.4)	6 (0.3)	0.77
Pulmonary embolism	8 (0.3)	2 (0.1)	6 (0.5)	0.16
Patients hospitalized after baseline	2297 (76.2)	1074 (72.7)	1228 (79.6)	<0.0001

Adverse Event	Totals	Rate Control*	Rhythm Control*	P Value*
African Americans				
Death	55 (25.8)	24 (21.0)	31 (30.6)	0.22
Composite endpoint of death, disabling stroke, disabling anoxic encephalopathy, major bleeding, cardiac arrest	73 (33.5)	32 (27.5)	41 (39.7)	0.15
Torsades de pointes VT	1 (0.6)	0 (0.0)	1 (1.3)	
Sustained VT	1 (0.4)	1 (0.8)	0 (0.0)	
Resuscitated cardiac arrest: VF, VT	1 (0.4)	0 (0.0)	1 (0.9)	
Resuscitated cardiac arrest: PEA, bradycardia or other	1 (1.0)	0 (0.0)	1 (2.0)	
Total number of patients with a CNS event	21 (11.3)	9 (9.5)	12 (12.9)	0.40
Ischemic stroke	17 (9.5)	7 (7.6)	10 (11.2)	0.36
Patient not taking warfarin	6	1	5	
Patient taking warfarin but INR <2.0	7	5	2	
In AF at time of event	6	4	2	
Primary intracerebral hemorrhage	3 (1.3)	1 (0.8)	2 (1.8)	0.52
Subdural/subarachnoid hemorrhage	1 (0.5)	1 (1.0)	0 (0.0)	
Disabling anoxic encephalopathy	2 (0.9)	0 (0.0)	2 (1.9)	
Myocardial infarction	10 (5.6)	5 (4.6)	5 (6.9)	0.89
Non-CNS hemorrhage	16 (8.0)	8 (6.8)	8 (9.3)	0.89
Systemic embolism	4 (1.6)	4 (3.2)	0 (0.0)	
Pulmonary embolism	0 (0.0)	0 (0.0)	0 (0.0)	
Patients hospitalized after baseline	176 (80.0)	88 (78.5)	88 (81.9)	0.42

ple variables linked to poorer prognosis that were significantly more frequent in African Americans and in Hispanics, in comparison to Caucasians. This included a greater likelihood of prior heart failure and abnormal left ventricular function. This was true despite a significantly lower age of African Americans and Hispanics in the study compared to Caucasians. There were also higher rates of hypertension among African Americans and higher rates of cardiomyopathy in Hispanics.

Significantly higher rates of heart failure, left ventricular dysfunction and lower rates of lone AF were observed in the African Americans and Hispanics, compared to Caucasians. This higher disease burden was present in African Americans and Hispanics, despite the fact that they were significantly younger than the Caucasian population enrolled in the trial. These observed differences could be due to sampling error in the relatively small numbers of African-American and Hispanic patients. Alternatively, this could be a reflection of differences in progression or other characteristics of disease due to the higher prevalence of risk factors in the African-American and Hispanic groups.

Among African Americans in AFFIRM, the survival in the rate-control arm was not different from the rhythm-control arm, nor was there a difference in the overall event-free survival. This was true despite the higher prevalence of cardiovascular risk factors in African Americans. In the Caucasian group, however, a higher overall survival in the rate-control arm reached statistical significance (p=0.04), but event-free survival did not differ between the treatment groups. In contrast, the Hispanic subgroup had significantly better survival (p=0.01) and event-free survival in the rhythm-control arm (p=0.038). The reasons for this striking difference in outcome from the main trial for the Hispanic subgroup are not identified. Sinus rhythm could have had a more favorable effect on the baseline status of Hispanic individuals in the trial—for example, the higher prevalence of cardiomyopathy—although the prevalence of sinus rhythm in the rhythm control declined in the later follow-up period (Figure 1). A higher percentage of Hispanics utilized digoxin in the rate-control arm.

Overall survival curves were plotted for the three populations studied and did not differ despite the differences within groups seen for the treatment arms and despite the baseline difference that may have influenced the results. Event-free survival was different for the overall groups, with better event-free sur-

Table 3. continued

Adverse Event	Totals	Rate-Control*	Rhythm-Control*	P Value*
Hispanics				
Death	24 (26.0)	19 (33.5)	5 (16.1)	0.01
Composite endpoint of death, disabling stroke, disabling anoxic encephalopathy, major bleeding, cardiac arrest	30 (29.1)	22 (38.0)	8 (16.6)	0.04
Torsades de Pointes VT	0 (0.0)	0 (0.0)	0 (0.0)	
Sustained VT	1 (0.8)	1 (1.4)	0 (0.0)	
Resuscitated cardiac arrest: VF, VT	0 (0.0)	0 (0.0)	0 (0.0)	
Resuscitated cardiac arrest: PEA, bradycardia or other	0 (0.0)	0 (0.0)	0 (0.0)	
Total number of patients with a CNS event	5 (5.7)	2 (2.9)	3 (8.7)	0.53
Ischemic stroke	5 (5.7)	2 (2.9)	3 (8.7)	0.53
Patient not taking warfarin	2	0	2	
Patient taking warfarin but INR <2.0	3	2	1	
In AF at time of event	2	1	1	
Primary intracerebral hemorrhage	0 (0.0)	0 (0.0)	0 (0.0)	
Subdural/subarachnoid hemorrhage	0 (0.0)	0 (0.0)	0 (0.0)	
Disabling anoxic encephalopathy	1 (1.7)	0 (0.0)	1 (3.3)	
Myocardial infarction	4 (4.0)	2 (3.4)	2 (4.6)	0.91
Non-CNS hemorrhage	8 (6.8)	4 (6.5)	4 (7.3)	0.79
Systemic embolism	0 (0.0)	0 (0.0)	0 (0.0)	
Pulmonary embolism	0 (0.0)	0 (0.0)	0 (0.0)	
Patients hospitalized after baseline	83 (74.4)	47 (72.4)	36 (76.3)	0.52

N (%); * percentages and p-values are derived from Kaplan-Meier analysis; VT: ventricular tachycardia; VF: ventricular fibrillation; PEA: pulseless electrical activity; CNS: central nervous system; INR: international normalized ratio; AF: atrial fibrillation

vival experience in Caucasians, as compared to both Hispanics and African Americans (p=0.182). Again, baseline characteristics might have influenced these results, but sample sizes were too small for adjusted survival analyses. Exploration of the basis for these results must await further investigation.

STUDY LIMITATIONS

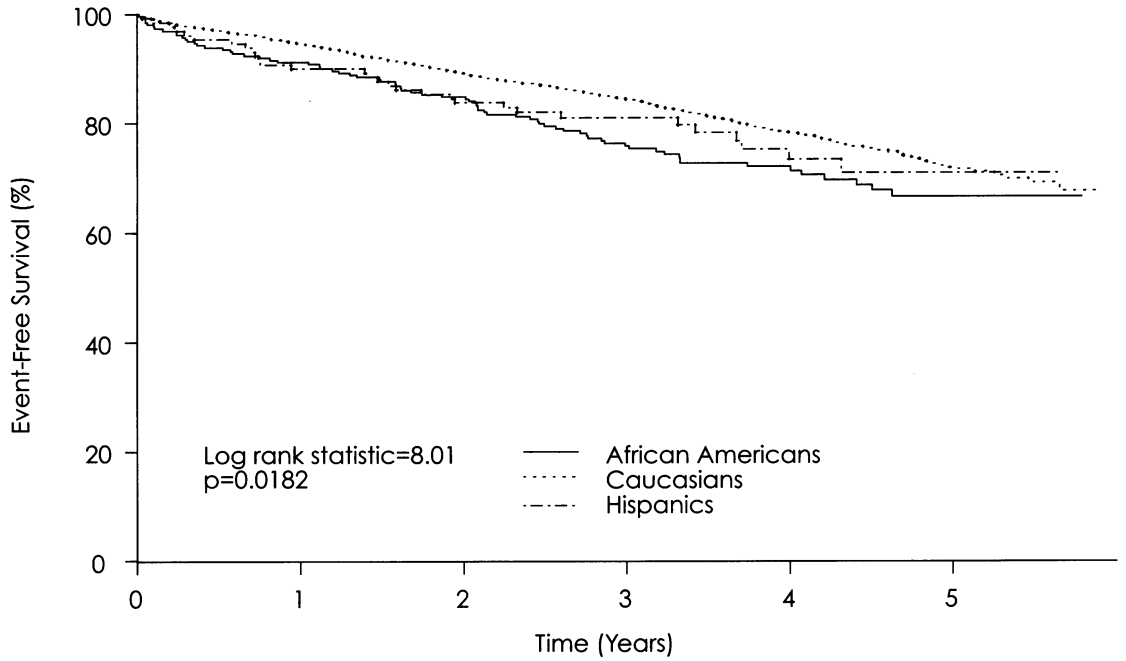
African-American and Hispanic patients were not recruited into the AFFIRM patient population in sufficient numbers to allow generalization beyond the subgroups who entered and completed the study. Multivariate analyses were not carried out because of concern that unwarranted conclusions might be drawn from small numbers. Similarly, the findings reported in these subgroup comparisons result from post hoc analyses. The more comparable rates of usage of warfarin in rate- and rhythm-control groups of African Americans and Hispanics than Caucasians may have contributed to the differential outcomes found. While differences in baseline characteristics may contribute to the outcome differences noted, sample size differences compromise the validity of more detailed analyses and support the need for further investigation. Comparable studies have not been carried out for comparison.

The relatively small numbers of AFFIRM participants in the African-American and Hispanic subgroups make it unwise to draw definitive conclusions from these post hoc analyses. However, the findings do raise the general question as to whether further refinements in patient risk profiles might identify subgroups who derive greater benefit from a rhythm-control strategy instead of a rate-control strategy and vice-versa.

CONCLUSION

Significant differences were found in baseline characteristics among the Caucasian, African-American and Hispanic populations. Different survival rates for AF were found for rate control versus rhythm control in Hispanic patients and the reverse of the findings in Caucasians where no difference in survival rates between rhythm and rate control were found. Furthermore, clinical event rates were not equal during follow-up. Because of the provocative findings of this data set with a minority population of limited size, further research is clearly indicated with adequate sample sizes.

Figure 4. Event free survival for race/ethnic groups



N, Events (%)						
AAs:	265, 0 (100)	231, 23 (91.2)	212, 39 (84.9)	155, 60 (75.8)	101, 67 (72)	40, 73 (66.5)
Caucasians:	3,599, 1 (100)	3,378, 192 (94.6)	3,135, 387 (89.2)	2,257, 534 (84.4)	1,283, 668 (78.3)	381, 738 (71.8)
Hispanics:	132, 0 (100)	116, 13 (90)	104, 21 (83.7)	71, 24 (81)	38, 29 (73.3)	13, 30 (70.9)

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