



Incidence of Atrial Fibrillation in African Americans post Atrial Flutter Ablation

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Abstract

Background: African Americans have a lower incidence of atrial arrhythmias, both atrial fibrillation (AF) and atrial flutter (AFL), despite a greater number of traditional risk factors. The incidence of AF after cavotricuspid isthmus (CTI) ablation in patients with typical AFL is markedly increased, approaching 40% in some studies. It is unknown if African Americans specifically have a similar rate of increased AF after CTI ablation for typical AFL.

We sought to identify differences in development of AF after CTI ablation for typical AFL with regards to race, between African American and non- African Americans. The hypothesis is that African Americans will have a lower incidence of AF after CTI ablation for typical AFL.

Methods: The electronic medical records of first time, successful CTI ablations performed for typical AFL were retrospectively reviewed over a 48 month period. Clinical variables were retrieved from the EMR. AFL was documented on ECG, Holter/ event monitor or device interrogation at clinical follow up visits. Follow up was obtained over a 1 year period. Patients were self-identified as African American, White, Hispanic or Other.

Results: The records of a total of 201 patients - 51 African Americans (25.4%) and 150 non-African Americans (74.6%) - who underwent CTI ablation for typical AFL were examined. Average age was similar (67.8 vs 66.3, p=NS) with a preponderance of men (77.6% vs 23.5%). There was a significantly lower rate of development of AF post CTI ablation for typical AFL in African Americans vs non-African Americans (22.2% vs 46.6%, p=0.002). Additionally, women were more likely to develop AF (53.1% vs 36.2%, p=0.026). African American men were the least likely to develop AF post AFL ablation (p=0.0062).

Conclusions: We observed a significantly lower incidence of AF among African American patients after CTI ablation for typical AFL.

Introduction

Atrial fibrillation (AF) is recognized as the most common clinically relevant arrhythmia and it is ubiquitous in general practice. In 2010, between 2.7 and 6.1 million Americans suffered from AF. Similarly, this figure is expected to rise to 12 million by 2050¹. The pathophysiology has been scrutinized extensively including multiple genetic and environmental factors; however, the totality of all contributing risk factors has not yet been elucidated. AF and atrial flutter (AFL) are two arrhythmias that may be commonly associated. This association generally reflects a similar arrhythmogenic substrate.

It has been observed that the development of isthmus-dependent AFL is often followed by AF¹³.

More recently, it has been demonstrated that despite similar or greater numbers of established risk factors, African Americans have a lower rate of AF as compared to white patients²⁻⁷. Additionally, the development of AF after AFL ablation is markedly increased in some studies approaching 40%⁸⁻¹⁰ and continues to rise thereafter¹⁵. Patients with a prior history of AF, female sex, and those treated with class I antiarrhythmic drugs or amiodarone prior to AFL ablation, as well as post CABG, the risk of development of AF is even higher^{11-12, 14}.

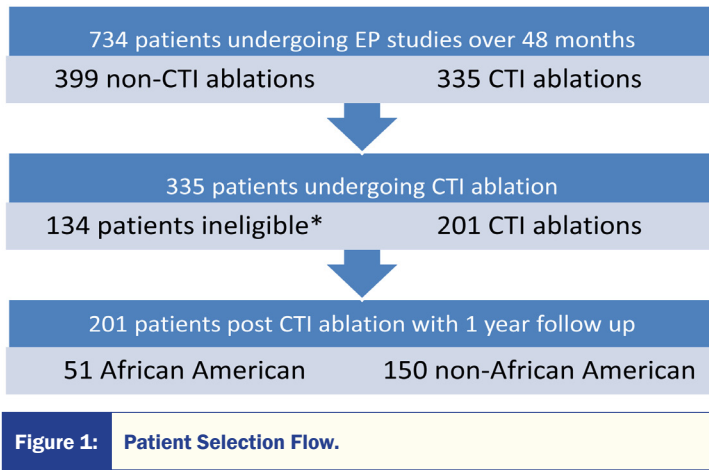
Key Words

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It is less well known if African American patients have similar increased rates of development of AF after AFL ablation. The goal of this study was to investigate in patients with typical (clockwise, isthmus dependent) AFL who underwent successful cavo-tricuspid isthmus (CTI) ablation whether the prevalence of AF was lower in



African American patients compared with non-African American patients.

Materials and Methods

The electronic medical records (EMR) of first time, successful CTI ablations performed for typical AFL were retrospectively reviewed for 48 months. Ablations were performed at a single, urban, tertiary-care, academic hospital. Success was defined as development of bi-directional block across the CTI. Clinical variables were retrieved from the EMR. AF was documented on ECG, via Holter/ Event monitor, via device interrogation at clinical follow up visits during a 1 year period after AFL ablation. Patients records were included if 1 month, 6 month, and 1 year data was obtainable. Patients were self-identified as African American, white, Hispanic or Other. Patients were excluded if they had a prior history of AF, or if complete follow up could not be obtained.

Study Population

Over a 48 month period, we identified 734 patients who underwent electrophysiology studies. 335 patients were identified who had typical AFL and underwent CTI ablation at a single academic, urban, tertiary care center. Patients were excluded for prior history of AF, incomplete follow up information (9%), unsuccessful ablation (3%) or those who required repeat ablation procedures (4%), and absence of ethnicity. The final number of patients was 201 (table 1).

Outcome Measures

The principal objective of the study was to assess AF prevalence and patient characteristics among African American and non-African American patients with AF who underwent CTI ablation. Other data collected for secondary analyses included the following clinical variables: age, sex, hypertension, ejection fraction, diabetes, device (pacemaker vs ICD), antiarrhythmic drug, beta blocker, digoxin, and anticoagulation status (fig 2).

Statistical Analysis

Sociodemographic factors and clinical variables were compared between African American and non-African American patients. The null hypothesis was that there was no difference between the

Table 1: Clinical Variables

Variable	African patients	American	Non-African patients	American	P value
LV EF	0.49		0.51		ns
Male Sex	0.73		0.76		ns
Age (yrs)	67.8		66.3		ns
ICD	0.14		0.046		<0.02*
Pacemaker	0.06		0.03		ns
Anti-arrhythmic	0.18		0.265		ns
Beta Blockers	0.62		0.83		<0.01*
Digoxin	0.04		0.02		ns
Diabetes	0.43		0.26		<0.05*
HTN	0.63		0.62		ns
Anticoagulation	0.9		0.86		ns
CAD	0.2		0.3		ns
Irrigated catheter	0.18		0.11		ns

*Denotes statistical significance $p < 0.05$. All values are absolute.

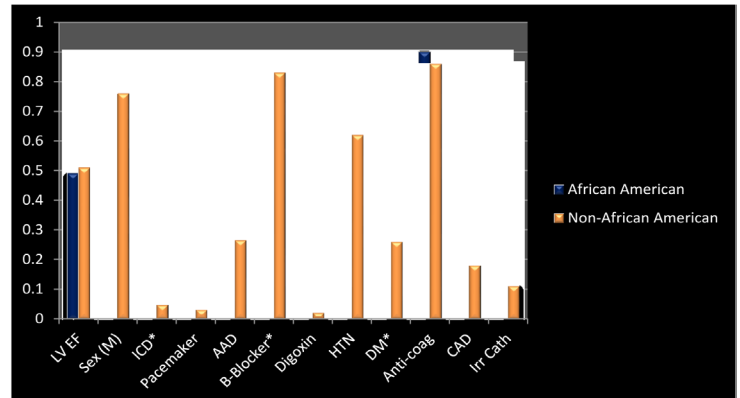


Figure 2: Patient Selection Flow.

development of AF based on race or ethnicity. All statistical analysis was performed using SPSS version 21.0 (SPSS Inc, Chicago, IL). For comparison of numerical values, Student's t- tests were used. Categorical variables were compared using chi square analysis. A p value of < 0.05 was considered statistically significant (two-sided).

Clinical Variables

The records of a total of 201 patients - 51 African American patients (25.4%) and 150 non-African American (74.6%) - who underwent successful CTI ablation for typical atrial flutter were examined. African Americans were more likely to have a pacemaker or defibrillators placed ($p < 0.02$) and more likely to be diabetic ($p < 0.05$) than non-African Americans. Additionally, African Americans were less likely to be prescribed beta blockers ($p < 0.01$). Other selected variables were not statistically significant. Average age was similar (67.8 vs 66.3, NS). There was a preponderance of males (77.6% vs 23.5%) (Table1).

Results

There was a significantly lower rate of development of AF post CTI ablation for typical AFL in African Americans vs non-African

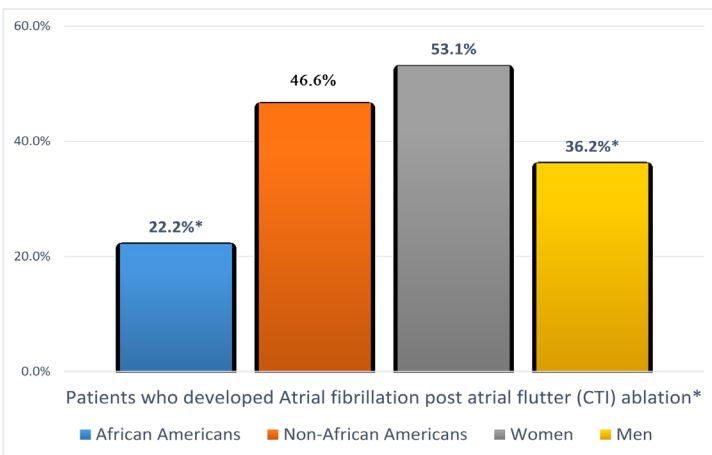


Figure 3: Patients who developed Atrial Fibrillation Post Atrial flutter(CTI) Ablation*

Americans. The probability of developing AF post CTI ablation was 22.2% for African Americans vs 46.6% for non-African Americans (chi square statistic of 9.969, $p=0.002$). Additionally, women were more likely to develop AF at 53.1% compared to their male counterparts at 36.2% (chi square statistic 4.958, $p=0.026$) (figure 3). The odds ratio was much less than 1. This finding was highly statistically significant with p value of 0.01. Furthermore, African American Males were much less likely to develop AF post AFL ablation compared to non-African American Males ($p=0.0062$). There was no statistically significant difference in the development of AF between African American women versus non-African American women ($p=0.975$) (figure 4).

Discussion

Our results that suggest that African Americans may have a lower rate of development of AF after AFL ablation despite the lower use of beta blockers and the greater amount of diabetes. More precisely, these results are greatly driven by the lack of development of AF by African American Males after AFL ablation. This reflects the “paradox” that African Americans have a lesser rate of AF despite

a greater number of risk factors⁷. Similar to previous results, female sex, hypertension, and diabetes were also more likely to develop AF after AFL ablation. From a greater perspective, the overall number of patients who developed AF after AFL ablation is higher than previously published⁹. This may represent a plethora of issues including: access to care, socioeconomic and insurance status, late presentation, and inability of recognition of symptoms.

If indeed there is a reduced occurrence of AF in African American patients, even those post successful AFL ablation, how does this phenomena affect treatment? More specifically, could there potentially be a protective factor especially in African American males that reduces AF origination? It is possible in the future that rate controlling agents, anti-arrhythmic drugs, anticoagulation and further ablations may become tailored to patients based on racial (and possibly gender) identity. Although AF rates have been shown to be significantly less in African Americans, rates of stroke are still markedly increased to the point that some have suggested adding ethnicity to the standard CHA₂DS₂-VASc score due to the elevated morbidity and mortality from cerebral vascular events¹⁵.

If there is a protective gene(s) that could be identified, isolated, and reverse engineered, this could conceivably lead to protection and possible correction / cure of AF in multiple populations. Race is largely a social construct and patients frequently self-identify; currently, there is no identifiable race-based biological mechanism increasing the propensity of stroke¹⁶. Obviously, this is an area that needs to be meticulously scrutinized with larger randomized trials; However, historically, it has been a tremendous challenge to enrol minority populations (i.e. African American males) in great numbers in clinical studies. This has been demonstrated over and over again due to many of the following factors: distrust of the medical establishment (ie. Tuskegee experiment), diminished access to care due to decreased healthcare providers and absence of healthcare coverage, as well as overall reduced adherence to guideline directed therapy.

Limitations

There are multiple limitations with this study. First, this is a single center, urban, retrospective, observational, non-randomized study. The size of the data sample as well as the preponderance of males may have skewed the interpretation. Second, the 1 year follow up period may not have been adequate to determine a significant difference as well as patients may have developed AF in the interim and not been detected. However, a single 20 patient study demonstrated that most patients developed AF in the first 4 months after AFL ablation using an implantable loop monitor¹⁵. Additionally, spurious factors that may confound the results could have been introduced which would have been impossible to control for. Finally, patients self-identified race. As a greater number of Americans are of mixed race, this was not specifically examined. Ideally, a prospective, randomized study with equal racial and gender proportions would definitively answer the question.

Conclusions

The development of AF after successful AFL ablation is a frequent occurrence. This study appears to demonstrate that there

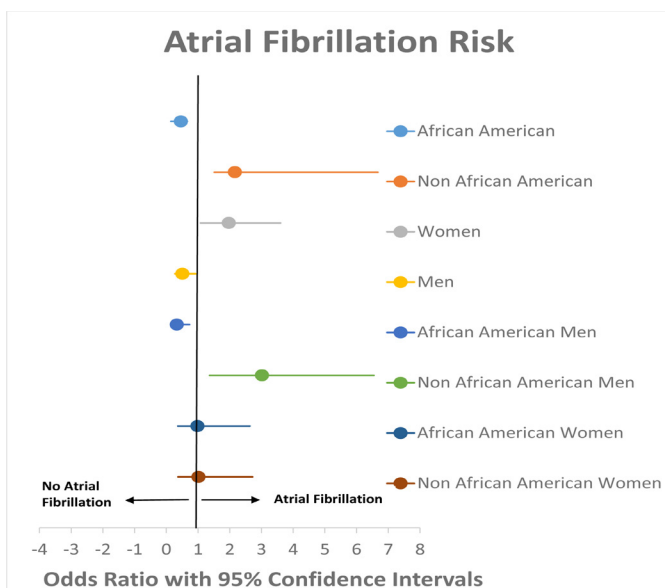


Figure 4: Atrial Fibrillation Risk with 95% Confidence Intervals

are differences in the rates of development due to racial ethnicity. African Americans, specifically males, appear to be at less risk of developing AF after AFL ablation than non-African Americans.

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