

# Racial Differences in the Utilization of Oral Anticoagulant Therapy in Heart Failure: A Study of Elderly Hospitalized Patients

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**To assess racial differences in the use of oral anticoagulant therapy for patients with heart failure, we conducted a cohort study of 30 hospitals in northeast Ohio. For 12,911 Medicare enrollees consecutively admitted in 1992 through 1994 with heart failure, crude and adjusted odds of being on oral anticoagulation were determined. The crude and adjusted odds of being African Americans on oral anticoagulant therapy relative to whites were 0.57 (95% confidence interval 0.47–0.69) and 0.55 (95% confidence interval 0.45–0.67), respectively. African-Americans with heart failure were much less likely than whites to receive oral anticoagulant therapy, even after adjusting for other variables associated with anticoagulant use.**

**KEY WORDS:** heart failure; anticoagulation; race.  
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The use of oral anticoagulant therapy for prophylaxis against thromboembolism in heart failure remains an area of much controversy. The lack of large, controlled, randomized trials that document the risks and benefits of this form of therapy for the prevention of thromboembolic events in chronic heart failure contributes to this controversy. Some studies report that anticoagulant therapy with warfarin lowers the incidence of thromboembolism and possibly all-cause mortality among patients with heart failure.<sup>1–4</sup> Other studies show no benefit.<sup>5,6</sup> These conflicting reports underlie the wide variation in clinical practice regarding the use of this therapy for thromboembolism prophylaxis in heart failure—i.e., only about 20% to 30% of physicians utilize this therapy for this purpose.<sup>7,8</sup>

This controversy aside, thromboembolism complicates chronic heart failure.<sup>2–6</sup> The most recent analysis of the SOLVD study revealed that approximately 25% of the

excess mortality observed in African Americans with heart failure can be accounted for by excess in thromboembolic deaths.<sup>9</sup> The reasons for this racial disparity in the thromboembolic deaths in heart failure remain unclear. Differential utilization of oral anticoagulant therapy for heart failure between African Americans and whites may play a role. Using a cohort of elderly, hospitalized patients with heart failure, we sought to compare African-American and white patients with respect to their use of oral anticoagulant therapy as outpatients.

## METHODS

### Study Patients

The study sample included 12,911 patients 65 years of age or older admitted with a principal diagnosis of congestive heart failure to 30 hospitals in northeast Ohio during the period July 1992 through December 1994. We identified all admissions with congestive heart failure from the Cleveland Health Quality Choice database. This database includes consecutive admissions, as identified by specific *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* principal diagnosis codes (398.91, 401.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, and 428.9). When we excluded patients whose race was reported as “other,” 12,911 patients were left for analysis.

### Data Collection

The Cleveland Health Quality Choice database includes information that was abstracted from patient’s hospital records on standard data forms by medical records technicians at each hospital. The reliability of this database was previously reported.<sup>10–11</sup> The database contains sociodemographic and clinical information. The information on oral anticoagulant use was abstracted from the list of prescribed medications on admission.

### Statistical Analysis

Associations between race, anticoagulant use, and other clinical characteristics were analyzed using  $\chi^2$  tests for categorical variables and *t* tests for continuous variables. Logistic regression was then used to determine whether race was independently associated with anticoagulant

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Table 1. Baseline Demographic and Clinical Features by Race\*

Clinical Feature <sup>†</sup>	African-Americans (n = 2,014)	Whites (n = 10,897)	P-Value
Mean age, y ± SD	77 ± 8	79 ± 8	.001
Male, n	823 (41)	4,586 (42)	.31
Hypertension	949 (47)	3,378 (31)	.001
Malignancy	45 (2)	264 (2)	.61
Chronic dialysis	59 (3)	85 (1)	.001
COPD/asthma	473 (24)	2,656 (24)	.39
Stroke	371 (18)	1,875 (17)	.19
Diabetes	720 (36)	3,329 (31)	.001
IHD	869 (43)	6,299 (58)	.001
Venous thromboembolism <sup>‡</sup>	3 (0.1)	12 (0.1)	NS
Gastrointestinal bleeding	44 (2)	331 (3)	.04
Liver disease	10 (0.5)	57 (0.5)	NS
Atrial fibrillation	162 (8)	1,931 (18)	.001
DNR order	229 (11)	2,107 (19)	.001
Alcohol use, % <sup>§</sup>	16	15	.16
Albumin, mean g/dL ± SD	3.5 ± 1	3.5 ± 1	.29
LVEF % category			
>0.40	198 (10)	1,499 (14)	.001
≤0.40	294 (15)	1,654 (15)	NS
Not recorded	1,522 (76)	7,744 (71)	.001

\*Continuous variables are reported as means ± SD; categorical variables are reported as number with percentage of the group in parentheses. NS indicates not significant.

<sup>†</sup>COPD indicates chronic obstructive pulmonary disease; IHD, ischemic heart disease; DNR, do not resuscitate; LVEF, left ventricular ejection fraction.

<sup>‡</sup>Venous thromboembolism includes both deep venous thrombosis and pulmonary embolism.

<sup>§</sup>Alcohol use as noted in the chart.

use. Simultaneous equation models were created using all variables, including race, that had a multivariate association of  $p < .20$  or less. To maximize adjustment for possible confounders, we also included hypertension and venous thromboembolism in the multivariate models, despite their lack of statistical significance. The  $c$  statistic for the final model was 0.70. All analyses were performed using SAS.

## RESULTS

African-American patients in this cohort were slightly younger than whites and more likely to have hypertension (47% vs 31%,  $p = .001$ ), diabetes (36% vs 31%,  $p = .001$ ), and end-stage renal disease requiring chronic dialysis (3% vs 1.0%,  $p = .001$ ). Whites were more likely to have ischemic heart disease (58% vs 43%,  $p = .001$ ), atrial fibrillation (18% vs 8%,  $p = .001$ ), and to have do-not-resuscitate status on record (19% vs 11%,  $p = .001$ ). The two groups had no statistically significant differences with respect to other major comorbidities (Table 1).

In total, 1,284 (10%) of the patients had been prescribed anticoagulant therapy prior to admission; 127 (6%) of African-American patients and 1,157 (10.6%) of white patients had been prescribed oral anticoagulants ( $p = .001$ ). African-American race, older age, and history of gastrointestinal bleeding were negatively associated with

being on oral anticoagulant therapy, while white race, male gender, history of atrial fibrillation, and stroke were positively associated with the use of oral anticoagulant therapy. The crude and adjusted odds of African Americans receiving outpatient oral anticoagulant therapy relative to whites were 0.57 (95% confidence interval [CI] 0.47–0.69) and 0.55 (95% CI 0.45–0.67) (Table 2).

To explore this further, we analyzed the subgroup of patients with atrial fibrillation (162 African Americans and 1,931 whites) or stroke (371 African Americans and 1,875 whites), two diagnoses for which anticoagulation is strongly recommended for patients with heart failure. The crude and adjusted odds ratios for use of oral anticoagulation for African Americans and whites were 0.88 (95% CI 0.56–1.33), 0.69 (95% CI 0.44–1.06), 0.59 (95% CI 0.42–0.82), and 0.60 (95% CI 0.43–0.86), respectively.

## DISCUSSION

In this cohort of elderly patients hospitalized for heart failure, African-American patients were significantly less likely than whites to receive outpatient oral anticoagulant therapy. To our knowledge, this is the first study that has examined racial variation in the use of oral anticoagulant therapy among elderly patients with heart failure. Other studies have reported significant variation with respect to clinicians' utilization of this therapy in heart failure<sup>7,8</sup> or

**Table 2. Associations with Being on Outpatient Oral Anticoagulant Therapy from Multivariate Models (N = 12,911)\***

Variable	Crude OR (95% CI)	Adjusted OR (95% CI)
African-American race	0.57 (0.47–0.69)	0.55 (0.45–0.67)
Age <sup>†</sup>	0.96 (0.95–0.98)	0.94 (0.94–0.95)
Male gender	1.33 (1.18–1.50)	1.20 (1.10–1.35)
Atrial fibrillation	2.82 (2.50–3.20)	3.20 (2.76–3.62)
Hypertension	0.91 (0.81–1.03)	0.96 (0.84–1.10)
Stroke	2.26 (1.98–2.57)	2.37 (2.10–2.71)
Venous thromboembolism	1.51 (0.20–12.55)	2.02 (0.24–17.0)
Alcohol use <sup>‡</sup>	0.97 (0.84–1.12)	0.86 (0.74–0.99)
Gastrointestinal bleeding	0.53 (0.34–0.83)	0.47 (0.30–0.73)
Liver disease	0.73 (0.30–1.82)	0.70 (0.30–1.70)
LVEF % category <sup>§</sup>		
>0.40	0.85 (0.68–1.06)	0.94 (0.79–1.12)
≤0.40	1.22 (1.05–1.42)	1.01 (0.90–1.20)

\*Adjusted for age, gender, history of atrial fibrillation, stroke, gastrointestinal bleeding, liver disease, alcohol use, venous thromboembolism, and LVEF category. OR indicates odds ratio; CI, confidence interval; LVEF, left ventricular ejection fraction.

<sup>†</sup>Age was entered into the models as a continuous variable.

<sup>‡</sup>Alcohol use as noted in the chart.

<sup>§</sup>Reference group for LVEF is "> 40% or missing."

in clinically proven indications, such as stroke prevention in atrial fibrillation.<sup>12</sup> But none of these studies addressed race as a variable.<sup>13,14</sup>

Our findings raise the possibility that differential utilization of oral anticoagulant therapy may partially explain the reported higher rates of thromboembolic deaths among African-American patients with heart failure.<sup>9</sup> The reasons underlying racial differences in the use of oral anticoagulant therapy in heart failure remain unexplained. The clinical uncertainty regarding benefits and risks of oral anticoagulant therapy in general, and specifically in heart failure, and physicians' concerns over the availability of follow-up care for African-American patients may play a role.<sup>15,16</sup> However, differential care by physicians managing patients with heart disease cannot be ruled out. In a recent report by Schulman et al., race was found to impact physicians' recommendations for intervention in the management of patients with heart failure.<sup>17</sup>

Several limitations should be considered when interpreting our results. Our study did not examine socioeconomic status, access to outpatient care, and individual patients' care preferences and choices. These factors could differentially influence physicians' decisions regarding oral anticoagulant therapy for heart failure, and could have biased our results in unpredictable ways. Our study reflects the findings of a single region.

In summary, this is one of the first studies that compared African-American and white hospitalized, elderly patients with heart failure with respect to the use of oral anticoagulant therapy. In this cohort, African Americans were significantly less likely than whites to be on oral anticoagulant therapy. This difference is not explained by known indications and contraindications of oral anticoagulant therapy. The clinical significance, as well as the reasons behind the observed racial differences in the use of

oral anticoagulant therapy for heart failure, await further study.

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