

# Stroke Prevention in Atrial Fibrillation: Are We Following the Guidelines?

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## Abstract

**Background:** Warfarin therapy substantially reduces stroke in atrial fibrillation (AF), yet medical literature reports it is only prescribed in 15-60% of eligible patients. No current national benchmarks for warfarin use in AF patients exist, and it is unclear whether the reported poor compliance represents current rates within primary care practices. The primary study objective was to measure the rate of warfarin use in eligible, high-risk AF patients in a large southeastern group family practice. Secondary objectives were to report the demographics, stroke-risk profiles, contraindications, and reasons for discontinuation of warfarin therapy.

**Methods:** A retrospective chart review was performed on all active patients with documented AF in a large southeastern group family practice/residency between July 1, 2000 and June 30, 2002. Data was abstracted on warfarin use, contraindications, stroke risk, and reasons for discontinuation.

**Results:** Four hundred ninety-one (491) patients were identified from the electronic billing system as potential study subjects. Two hundred eighty-three (283) patients met study criteria, with 210 patients considered to be at high-risk of stroke without contraindications to warfarin therapy. Ninety-four percent (198/210) of these patients were prescribed warfarin during the study period, and 87% (172/198) continued warfarin throughout the study period.

**Conclusions:** Family physicians in this practice prescribe warfarin in AF more frequently than published rates, demonstrating that high rates of physician adherence to standards are achievable in primary care. Most patients in this setting were considered high-risk for stroke.

**Key words:** anticoagulation, atrial fibrillation, warfarin, stroke, family medicine

## INTRODUCTION

Atrial fibrillation (AF) is the most common sustained arrhythmia affecting 0.9% of the United States population.<sup>1</sup> The incidence of AF increases sharply with age affecting 5.9% of people over 65 years and 10% of those greater than 80, with a median age of 75 years.<sup>1</sup> AF is associated with a six-fold increase in the risk of stroke, with 50% of strokes occurring in patients greater than 75 years.<sup>2</sup> The annual stroke rate is 6-12% in patients older than 70 years with any high-risk factor for stroke.<sup>3-5</sup>

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have a relative risk reduction of 70% with warfarin vs. placebo, and a 20% reduction with aspirin vs. placebo.<sup>3-5</sup> Given the high incidence of stroke in AF patients and the efficacy of warfarin in preventing stroke, the American College of Chest Physicians (ACCP) published grade A recommendations via the Fourth ACCP Consensus Conference on Antithrombotic Therapy in 1995.<sup>6</sup> These recommendations were based on level 1 evidence, and remain largely unchanged in the most recent ACCP guidelines from the Sixth ACCP Consensus Conference on Antithrombotic Therapy.<sup>7</sup> In these guidelines, patients are stratified into risk categories to guide appropriate antithrombotic therapy (see Table 1). AF patients are categorized as high-

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**Table 1.**  
**ACCP Stroke Prevention Guidelines 2001<sup>7</sup>**

Atrial Fibrillation Stroke Profile	Risk Factors	Treatment Guidelines
High Risk	One or more of the following: <ul style="list-style-type: none"> <li>■ Age ≥ 75 years</li> <li>■ History of hypertension</li> <li>■ Prior cerebrovascular accident/transient ischemic attack</li> <li>■ Prior arterial thromboembolism</li> <li>■ Poor left ventricular systolic dysfunction (ef&lt;40%)</li> <li>■ Rheumatic mitral valve disease or prosthetic heart valve</li> <li>■ Two or more moderate-risk factors</li> </ul>	Warfarin (INR 2.5, range 2-3)
Moderate Risk	No high-risk factors and one of the following: <ul style="list-style-type: none"> <li>■ Age 65-74 years</li> <li>■ Diabetes</li> <li>■ Coronary Artery Disease</li> </ul>	Warfarin (INR 2.5, range 2-3) or Aspirin 325 mg/day
Low Risk	No high- or moderate-risk factors and: <ul style="list-style-type: none"> <li>■ Age &lt;65 years</li> </ul>	Aspirin 325 mg/day

moderate-, and low-risk for stroke based on age, hypertension, previous cerebral embolic event, poor left ventricular systolic function, the presence of valvular disease or a mechanical valve, diabetes, or coronary artery disease. Patients in the high-risk category should receive warfarin therapy unless contraindicated, whereas patients in the low-risk category should be maintained on aspirin therapy. Patients in the moderate-risk category can be maintained on either warfarin or aspirin therapy. Despite these nationally accepted guidelines, published studies report only 15-60% of eligible AF patients are prescribed warfarin, with family physicians reported as having the lowest use rates in AF.<sup>8-15</sup> We do not believe these low rates reported for family physicians are accurate.

Our primary study objective was to measure the current rate of warfarin use in eligible high-risk AF patients in a large southeastern group family practice. Secondary objectives were to report the demographics, stroke risk profiles of patients with AF, and the contraindications and reasons for discontinuation of warfarin therapy.

## METHODS

A retrospective chart review was conducted from the 57,912 active patients, defined as seen in the clinic within two years of start of study, receiving care through Cabarrus Family Medicine Residency Program (CFMR) at Cabarrus Family Medicine, PA, (CFM) clinics. CFM operates five family practice clinics in five municipalities in North Carolina (Concord, Kannapolis, Harrisburg, Mt. Pleasant, and Richfield). These clinics function as residency training and practice sites for CFMR, within a large multi-office community practice. The 28 attending physicians and 24 resident physicians utilize NorthEast Medical Center (NEMC), the only hospital in Cabarrus County, nearly exclusively for all admissions.

The study period was defined as July 1, 2000 to June 30, 2002. Patients were included in the study if they visited a CFM clinic during the study period and AF was documented by electrocardiogram or medical records including AF as a diagnosis. For study purposes, AF included atrial flutter and any subtype of AF (e.g., paroxysmal, chronic). AF was considered remote if a patient remained in sinus rhythm throughout the study period but records indicated a history of AF.

In order to ensure that we captured as many patients as possible with AF, we searched CFM's electronic billing database (Medical Manager™) to identify patients seen in the study period and who had an ICD-9 diagnosis of atrial fibrillation or atrial flutter (427.31-427.32) any

time during the preceding seven-year period. As an additional search, we used the hospital's (NEMC) electronic billing database to identify additional hospitalized patients with the same ICD-9 codes discharged during the study period with a CFM attending physician or a CFM primary care provider.

A data collection tool was developed and piloted with ten medical records. Direct, on-site abstraction was conducted by a single resident physician (BEP) utilizing a computer database on a laptop and Windows based PDA. Hospital records were utilized as needed to complete data abstraction.

Risk factor variables were recorded for the purpose of stratifying patients into high, moderate, and low stroke risk categories (see Table 1). If a patient received warfarin anytime during the study period warfarin use was recorded as positive. Contraindications and acceptable reasons to not prescribe warfarin were based on Medical Review of North Carolina, Inc.'s *National Stroke Medicare Quality Improvement Project*<sup>16</sup> (See Table 2) and were recorded when patients were not started or continued on warfarin.

SPSS software was used to analyze standard descriptive statistics and *p* values for categorical variables were calculated using nonparametric  $\chi^2$  tests. Categorical variables of risk were tabled with whether or not warfarin was prescribed. Chi-square statistics were computed which compared measured rates of prescribing to recommended guidelines, or whether or not patient categories exceeded base rate expectations as supported by the literature.

## RESULTS

A total of 491 potential study patients were identified by CFM and NEMC billing systems, with 490 patient charts located and abstracted. Two hundred seven patients were excluded after detailed chart reviews revealed 117 of them had

**Table 2.**  
**Contraindications to and Acceptable Reasons Not to Prescribe or to Discontinue Warfarin Therapy<sup>11</sup>**

Contraindications/acceptable reasons patients not on warfarin therapy	
<ul style="list-style-type: none"> <li>■ Syncope</li> <li>■ Multiple falls/risk of falls</li> <li>■ Advanced dementia</li> <li>■ Hemorrhagic cerebrovascular accident</li> <li>■ Patient noncompliance/refusal</li> <li>■ Warfarin allergy</li> <li>■ Prior serious gastrointestinal bleeding and/or untreated or unresponsive peptic ulcer disease</li> <li>■ Predisposition to bleeding (thrombocytopenia, end-stage renal disease, cirrhosis, hemophilia)</li> </ul>	<ul style="list-style-type: none"> <li>■ Major bleeding (requiring hospitalization or transfusion)</li> <li>■ AF lasting &lt;48 hours and did not recur or secondary to medical condition</li> <li>■ Seizure disorder</li> <li>■ At risk of falls</li> <li>■ Prior bleeding with anticoagulants</li> <li>■ Alcohol abuse</li> <li>■ Terminal/comfort care</li> <li>■ Extensive, metastatic cancer</li> </ul>
Contraindications to Warfarin Therapy in Study	# (% high-risk patients, n=257)
One episode <48 hours or AF secondary to medical condition	9 (3.5%)
Prior/predisposition to major bleeding	9 (3.5%)
Syncope, seizures, multiple falls	8 (3.1%)
Advanced dementia	7 (2.7%)
Prior bleeding with anticoagulants	5 (1.9%)
Patient declined warfarin	5 (1.9%)
Alcohol abuse, prior noncompliance	3 (1.2%)
Metastatic cancer, comfort care only	1 (0.4%)

remote AF only, 60 were without a diagnosis of AF, and 30 patients were not seen in the study period. AF was prevalent in 6.1% of patients age 75 and older and 0.69% of all patients (see Table 3, Figure 1). These prevalence rates are consistent with the published literature. The types of AF documented were evenly distributed between paroxysmal, chronic, and unspecified (see Table 3).

Of the 283 patients who met study criteria, 257 (91%) were categorized as high-risk for stroke by having at least one high-risk factor, or at least 2 moderate-risk factors listed in Table 1. Of these 257 patients, 47 (18%) were considered not to be warfarin candidates (see Table 2), leaving 210 patients eligible to receive warfarin therapy for stroke prevention. The most common acceptable reasons not to prescribe warfarin were: transient AF secondary to medical condition/1 episode lasting less than 48 hours, prior/predisposition to major bleeding, syncope, seizure, or multiple falls, and advanced dementia.

Ninety-four percent (198/210) of eligible high-risk AF patients were prescribed warfarin during the study period. Results were unchanged when moderate-risk patients (n=7), who are recommended warfarin or aspirin, were included in the analysis. Likewise, 87% (172/198) of active patients continued warfarin throughout the study period. Warfarin was discontinued during the study period in 26 patients; 14 patients had valid reasons documented, including major bleeding (2.5%), patient refusal (1.5%), and AF secondary to medical condition/1 episode lasting <48hrs (1.5%), whereas 12 patients did not have documentation of an acceptable reason.

The majority (11/15) of female patients not started or maintained on warfarin were noted to have the paroxysmal subtype of AF. There was no such difference in AF subtypes among males. Age and clinic location had no correlation with warfarin use.

## DISCUSSION

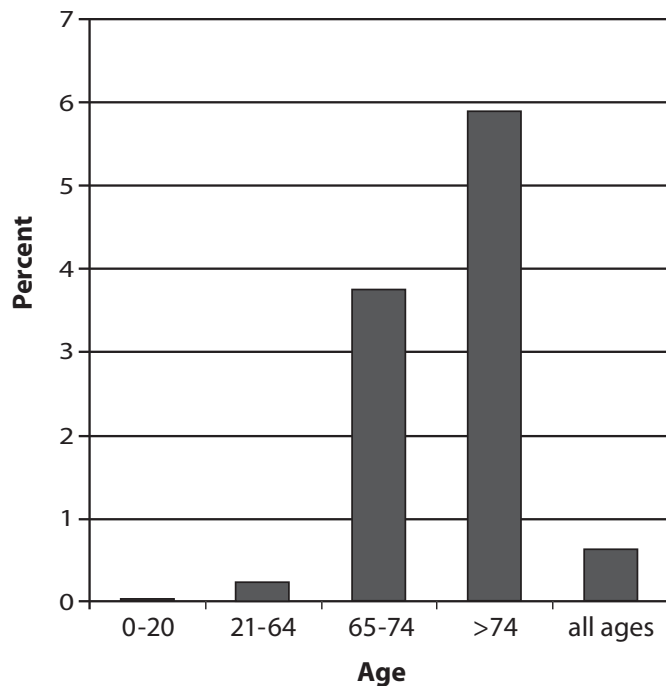
This retrospective study of warfarin use in high-risk AF patients in a large primary care setting demonstrates a high rate of compliance with national guidelines set forth by the American College of Chest Physicians and challenges the previously low compliance rates for Family Practitioners.<sup>7</sup> Currently, there are no published national benchmarks for achievable warfarin use in AF. CFM's 94% prescription rate is significantly higher than all other rates found in the literature ( $\chi^2 = 39.00$ ,  $P < 0.001$ ).<sup>8-15</sup> We located eight publications investigating warfarin use in AF patients with most of the data collected in the early 1990's. Three of these trials investigated warfarin use in hospitalized patients admitted with AF with or without stroke,<sup>8,10,15</sup> while three trials reported warfarin use in long-term care facilities (LTCF).<sup>9,13,14</sup> The remaining two trials described warfarin use in outpatient settings over a period of time.<sup>11-12</sup> Each trial considered contraindications to warfarin therapy in calculating the number of patients on warfarin, and five of these trials reported the number of ideal candidates on warfarin.<sup>8-10,12,14</sup> The acceptable contraindications were similar to each other and to our study. Valid contraindications shared by these investigations included fall risk, bleeding history, peptic ulcer disease, and terminal illness. Our study reports 18% of patients with contraindications (see Table 2), while the other trials varied from 1% to 81%, with LTCF patients gleaming the highest proportion of ineligibility.

**Table 3.**  
**Patient Demographic Data and Prevalence of AF within Clinic System**

Patient Demographics (n=283)	
Female	137 (48%)
Median age	74 years (range 21.8 - 106.2)
Age ≥ 75 years	140 (49.1%)
Age 65-74 years	70 (24.7%)
Age < 65 years	73 (26.1%)
Paroxysmal AF	32.5%
Chronic AF	28.6%
Unspecified AF	38.9%

**Figure 1.**  
**Prevalence of Atrial Fibrillation at CFMR Clinics (n=57,912)**

\*includes patients with remote AF documented between 1995-2000



The percentage of eligible patients on warfarin was 38% and 69% in hospitalized patients,<sup>8,10</sup> 25% and 53% in LTCF patients,<sup>9,14</sup> and 35% in the clinic setting.<sup>12</sup> The remaining three trials did not report eligible patients, but rather the total number of patients on warfarin. Stafford et al<sup>11</sup> compared warfarin use among cardiology, internal medicine, and family practice clinics from 1980 to 1993, with internal medicine having the highest portion of patients on warfarin at 40%, cardiology at 32%, and family practice at 15%. In a report by Jencks et al,<sup>15</sup> Medicare patients with AF in North Carolina between 1998 and 1999 had a 60% warfarin prescription rate at hospital discharge. No definite trend of improved warfarin use can be detected by these studies, despite the growing body of evidence supporting its use. It is unclear whether the quoted rates could be low due to study design, period of study compared to date of new guidelines, or whether rates in those studies represent lower compliance. A recent review of the literature describes numerous potential reasons for noncompliance with warfarin use.<sup>17</sup> Increasing age, perceived hemorrhage risk, and perceived noncompliance are consistent physician barriers to prescribing warfarin. Other barriers identified were difficulty in monitoring and unfamiliarity with the clinical guidelines. Physicians were found to be more enthusiastic about warfarin in patients with a history of cardioembolic stroke.

The significantly higher rates found in this study population suggest that very high compliance rates are achievable in a primary care practice. Factors which may have influenced this high

compliance rate include (1) focus on education and current standards of care within a residency program, (2) close working relationship with local cardiologists, or (3) hospital disease management protocols initiated near the end of the study period. Currently at NEMC, patients admitted for AF are flagged with an anticoagulation form in which providers are asked if the patient will be discharged on appropriate anticoagulation. A summary of the guidelines are included on this form with acceptable contraindications to warfarin therapy. These strategies will continue to educate and remind providers of the importance of warfarin therapy in the treatment of AF.

There was no specific practice-based disease management system in place in the clinics during the study period. Further evaluation and study of compliance rates with current guidelines in other clinic settings is needed, including evaluation of the most effective method in achieving compliance. The authors believe that practice-based disease management systems in primary care will be key to improving care for patients in the future.

Unlike studies that focus on warfarin prescribing at hospital discharge, our study followed patients throughout a two-year period and documented an 87% continuous warfarin use rate in this population, suggesting good continuity of care and practice-based disease management. Also, our study did not differentiate between chronic AF and paroxysmal AF with regard to eligibility for warfarin therapy, despite the common belief that patients maintaining normal sinus rhythm for a period of time can safely stop anticoagulation. In the recently published AFFIRM trial,<sup>18</sup> the majority of strokes in both groups (rate control group versus rhythm control group) occurred in patients who had either stopped warfarin therapy or had an INR <2.0. Of the 77 patients in the rate control group with stroke, 32% had discontinued warfarin compared to 55% (44 of 80) in the rhythm control group. We posit that clinicians make the decision to stop warfarin more often in AF patients on antiarrhythmic agents assuming normal sinus rhythm will be maintained. The decision to anticoagulate a high-risk AF patient is more likely to improve outcomes than antiarrhythmic therapy. In the AFFIRM trial, antiarrhythmic therapy had no effect on mortality (trend toward increased mortality,  $p=0.08$ ) and had significantly increased rates of hospitalizations, torsades de pointes, and bradycardic cardiac arrest as compared to rate control and anticoagulation alone. Moreover, AF patients are at risk of stroke whether or not they are in normal sinus rhythm (NSR) or AF. In another recently published trial of rate control vs rhythm control, 17% of strokes in the rhythm control group occurred after cessation of warfarin therapy. In all but one of these six cases, the patient was still in NSR at the time of stroke.<sup>19</sup>

Future analysis measuring compliance with warfarin monitoring and maintenance of INR goals is needed. Management of stroke prevention with warfarin therapy in AF patients can be effectively performed by family physicians. **NCMJ**

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