

Underuse of Oral Anticoagulation for Individuals with Atrial Fibrillation in a Nursing Home Setting in France: Comparisons of Resident Characteristics and Physician Attitude

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OBJECTIVES: To describe the characteristics of nursing home residents diagnosed with atrial fibrillation (AF) and eligible for oral anticoagulants who did not receive these drugs and to detail the conditions that physicians who decide not to prescribe anticoagulants take into account.

DESIGN: Cross-sectional.

SETTING: Nursing home.

PARTICIPANTS: Nursing home residents with a history of AF (N = 1,085).

MEASUREMENTS: Data were collected on clinical characteristics, geriatric syndromes, and antithrombotic regimen. Multivariate logistic regression was used to identify factors associated with nonprescription of anticoagulants. A standardized questionnaire was submitted to physicians in charge of patients with AF, to detail conditions associated with their medical decision not to prescribe anticoagulants.

RESULTS: History of AF was present in 1,085 nursing home residents (10.1%), mean age 87, with a mean CHA2DS2-VASc score of 5.1 ± 1.4 . Of these residents with AF, 544 (50.1%) did not receive anticoagulants. Recurrent falls (odds ratio (OR) = 4.9, 95% confidence interval (CI) = 2.4–9.9, $P < .001$), past history of bleeding (OR = 3.62, 95% CI = 1.54–8.51, $P = .003$), paroxysmal AF (OR = 3.5, 95% CI = 1.83–6.66, $P < .001$), and advanced age (OR = 1.1, 95% CI = 1.01–1.17, $P = .02$) were significantly associated with not prescribing anticoagulants. Recurrent falls (47%), cognitive impairment (22.6%), and advanced age (16.4%) were the main reasons for not prescribing anticoagulants.

CONCLUSION: The prevalence of AF in a cohort of very old nursing home residents was 10%. Anticoagulation was prescribed in fewer than 50% of eligible cases despite high individual risk of stroke. Geriatric syndromes, especially falls and cognitive disorders, were the main reported contraindications for prescribing anticoagulants. Physicians caring for those residents wrongly thought that paroxysmal AF caused fewer thromboembolic events than permanent AF, which explains lower rates of anticoagulant prescription in individuals with paroxysmal AF. *J Am Geriatr Soc* 63:71–76, 2015.

Key words: atrial fibrillation; anticoagulation; nursing home

The prevalence of atrial fibrillation (AF) is 5% in people aged 65 and older and approximately 10% in those aged 80 and older.¹ The risk of mortality associated with AF events (hazard ratio = 2.14) includes death from cardiac and noncardiac causes.²

The most devastating consequence of AF is thromboembolic stroke. The average risk of stroke is 5% per year with nonvalvular AF.³ Risk of stroke has been shown to be five times as high in individuals with AF.⁴ In addition, data suggest that AF is associated with greater risk of cognitive impairment and dementia, with or without a history of clinical stroke.⁵

Anticoagulation therapy is a proven and effective preventive treatment for thromboembolic events in AF.⁶ The benefits of anticoagulants in reducing the risk of stroke³ and mortality have been estimated at 68% and 33%, respectively.⁷

Nonetheless, some physicians believe that the risk of severe bleeding outweighs the benefits of anticoagulants, which limits their prescription.⁸ The benefit:risk ratio that can be estimated using clinical scores such as CHA2DS2-VASc or Hypertension, Abnormal Renal/Liver Function, Stroke, Bleeding History or Predisposition, Labile INR,

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Elderly, Drugs/Alcohol Concomitantly (HAS BLED) guide the decision-making process involved in prescribing warfarin for stroke prevention, although the relevance of these scores is limited in old and very old individuals. This practice is recommended in European and Canadian AF guidelines. Patient preferences should also be considered.⁹ Age alone is a single and sufficient factor in favor of initiation of anticoagulation.¹⁰

Conversely, candidates for anticoagulation therapy have many bleeding risk factors, such as labile hypertension or advanced age (HAS-BLED), that ultimately may limit use of anticoagulants even though they are also major risk factors for stroke.

Currently, the rate of anticoagulation prescription for individuals with AF remains low in elderly populations. Underuse of oral anticoagulants in AF is one of the most common examples of unadapted prescription in elderly adults.^{11,12} In 54 studies on warfarin therapy in high-risk groups of individuals aged 80 and older with nonvalvular AF, the estimated prevalence of underprescription was approximately 40%.¹¹ In nursing homes, anticoagulation treatment practices for residents with AF have been less extensively studied. In one study of 126 residents of seven nursing homes (mean age 87), the rate of warfarin prescription ranged from 8% to 47%.¹³

In addition to demonstrated bleeding risks, physicians therefore consider many other conditions or geriatric syndromes such as falls, head injuries, errors in medication, chronic anemia, and cognitive disorders to be potential contraindications to administering anticoagulants.

It was hypothesized that geriatric syndromes such as falls, cognitive impairment, malnutrition, and functional impairment could explain the underprescription of anticoagulants in older adults with AF. The goals of this cross-sectional study of a representative sample of nursing home residents were to detail the characteristics of residents not treated with anticoagulants and to determine why physicians treating these residents did not prescribe treatment.

METHODS

The cohort included all residents aged 75 and older diagnosed with nonvalvular AF in 104 nursing homes in France. Diagnosis of AF was based upon medical charts and confirmed according to electrocardiogram within the previous 24 months.

Residents were prospectively identified during 1 week in March 2012 after approval by the medical staff and board of directors of each institution. The institutional review board of Rouen University hospital approved the study protocol.

During the second week, investigators collected data on age, sex, and comorbidities and burden of disease using the Charlson Index, from medical charts on all preselected residents meeting the inclusion criteria.¹⁴ Characteristics of AF (permanent or paroxysmal, overall time spent in AF) were recorded. CHA2DS2-VASc score was calculated to assess risk of stroke on the basis of clinical characteristics at inclusion. A CHA2DS2-VASc score of 2 or greater was considered high risk.¹⁰

Other comorbidities, including cardiovascular diseases (e.g., hypertension), history of severe bleeding that had

required hospitalization, geriatric syndromes (recurrent falls defined by ≥ 2 episodes in the previous 3 months), cognitive impairment including history of dementia (without any systematic neuropsychological evaluation), and history of malnutrition (body mass index ≤ 18.0 kg/m² or recent weight loss ($>5\%$ in 3 months), were checked for. Dependency was estimated according to the national French tool Groupe Iso Ressource (GIR). A nursing home's average balanced GIR score was considered to be an indicator of care burden from which financial requirements (or need) were calculated. Budgets were therefore allocated using custom allocation autonomy to nursing homes for resident care according to average level of dependance.

Daily treatment of participants was recorded. Drug regimens considered were vitamin K antagonist (VKA) prescription (for ≥ 3 months), antiplatelet agents or antiplatelet agents in association with VKA, and no antithrombotic treatment.

Assessment of individual risk of hemorrhage or past contraindication to anticoagulation was limited to history of documented severe hemorrhage leading to hospitalization, labile international normalized ratio (INR), or information from the residents' chart. Severe hemorrhage was defined as history of bleeding (intracranial, digestive, deep hematoma) resulting in hospitalization or transfusion. Labile INR was adapted from HAS-BLED score and defined as less than 60% of time in the therapeutic range ($2 < \text{INR} < 3$) in the previous 6 months.¹⁵

Questionnaire submitted to physicians in charge of residents' care.

An open questionnaire was submitted to physicians caring for all individuals with AF who had received no anticoagulation treatment asking them to list and rank (from major to minor) the main causes or conditions (up to 10 conditions) for not prescribing anticoagulant agents.

Data Analysis

Based on recommendations in the literature, it was postulated that all individuals with AF without previously documented absolute contraindications to anticoagulation listed in their medical chart should receive anticoagulant agents for stroke prevention. Thus, two groups were defined and then compared according to anticoagulation status: VKA treatment group (anticoagulant users) and anticoagulant nonusers.

Statistical Analysis

Data were anonymized and entered into a spreadsheet and analyzed. Qualitative variables were expressed as number and absolute percentage. Qualitative variables were compared between the groups using chi-square or Fisher exact tests as appropriate. Statistical significance was defined as $P < .05$. Quantitative variables were expressed as means \pm standard deviations. Quantitative variables of cases and controls were compared using unpaired the Student *t*-test.

All potential risk factors were investigated using univariate analyses, and variables with *P* values that remained significant at the 5% level in the presence of other selected variables were retained in the final model.

RESULTS

Of the 10,660 residents living in 104 selected nursing homes, 1,085 with documented AF were included in this analysis (10.1%).

The mean age of the sample was 87.1 ± 5.3 (range 75–102), and 73.4% were female. The 1,085 residents included in the study had been living in a nursing home for an average of 46.8 ± 41.9 months. Duration of AF was undetermined in 60.4% of cases. Eight hundred (73.8%) residents had permanent AF, and 285 (26.2%) had paroxysmal AF. The mean CHA2DS2-VASc score was 5.1 ± 1.4 . The main characteristics of these 1,085 residents are listed in Table 1.

Table 1. Participant Characteristics (N = 1,085)

Characteristic	Value
Age, mean \pm SD (range)	87.1 ± 5.3 (75–102)
Female, n (%)	796 (73.4)
Time in nursing home, months, mean \pm SD (range)	46.8 ± 41.9 (7–141)
Time since atrial fibrillation first diagnosed, yrs, n (%)	
<1	62 (5.7)
1–5	368 (33.9)
Unknown	655 (60.4)
AF type, n (%)	
Paroxysmal	285 (26.2)
Permanent	800 (73.8)
CHA2DS2-VASc, mean \pm SD (range)	5.1 ± 1.4 (2–9)
Number of daily medications, mean \pm SD	6.8 ± 2.5 (0–18)
Charlson Comorbidity Index, mean \pm SD (range) ^a	5.1 ± 1.4 (2–9)
Vascular comorbidities, n (%)	
Heart failure	436 (40.2)
Hypertension	815 (75.1)
Non-AF-associated arrhythmia ^b	133 (12.2)
Myocardial ischemia	268 (24.7)
Heart valve disease	
Aortic stenosis	94 (8.6)
Aortic insufficiency	47 (4.3)
Mitral insufficiency	97 (8.9)
History of stroke	349 (32.1)
Venous thrombosis	142 (13.1)
History of bleeding ^c	117 (10.8)
Diabetes mellitus	226 (20.8)
Malnourished, n (%) ^d	272 (25)
Cognitively impaired, n (%) ^e	777 (71.6)
Falls, n (%) ^f	204 (18.8)

^aEffect of disease on mortality, including 19 comorbidities. One-year mortality increases with increasing score ranged from 12% (index = 0) to 85% (index \geq 5).

^bAtrioventricular block, supraventricular tachycardia.

^cGastrointestinal bleeding, hemorrhagic stroke, or deep hematoma requiring hospitalization or transfusion in an individuals taking oral anticoagulants.

^dBody mass index \leq 18.0 kg/m², albuminemia $<$ 30 g/L, or weight loss of more than 5% in 3 months.

^eAccording to medical record.

^f \geq 2 falls in previous 3 months.

SD = standard deviation; AF = atrial fibrillation.

Participants were classified as dependent according to their average balanced GIR score, a score of 600 or above suggesting a high level of disability (mean 717.6, range 606–880).

Five hundred forty-four residents (50.1%) were not undergoing VKA treatment. In this group, 412 (75.7%) received a single antiplatelet treatment, 50 (9.2%) received dual antiplatelet therapy, 32 (5.9%) received a combination of anticoagulants and aspirin, and 50 (9.2%) did not receive any antithrombotic treatment.

Characteristics of the Anticoagulant Nonuser Group and Comparison with the Anticoagulant User Group

Anticoagulant nonusers were older (88.3 ± 5.2 vs 85.8 ± 4.9) and more often undernourished, had more cognitive impairments, and were more prone to falling. They were more likely to have paroxysmal AF (37.9% vs 14.6%), a lower CHA2DS2-VASc2 score (4.9 ± 1.4 vs 5.3 ± 1.4), and a past history of severe hemorrhagic disease (16.1% vs 5.3, $P < .001$) and less likely to have conditions such as hypertension, heart failure, and diabetes mellitus (Table 2). The Charlson Comorbidity Index¹⁴ of the groups was not statistically different. Labile INR was observed in 119 anticoagulant users (22%).

Multivariate Analysis

Criteria significantly and independently associated with nonprescription of anticoagulants were falls (odds ratio (OR) = 4.9, 95% confidence interval (CI) = 2.4–9.9, $P < .001$), age (OR = 1.1, 95% CI = 1.01–1.17, $P = .02$), paroxysmal AF (OR = 3.5, 95% CI = 1.83–6.66, $P < .001$), and past history of bleeding (OR = 3.62, 95% CI = 1.54–8.51, $P = .003$) (Table 3).

Prescriber Attitudes Toward Anticoagulant Nonusers

Standardized questionnaires were submitted to 298 physicians and were completed for 386 nursing home residents who did not receive anticoagulation treatment (response rate 70.9%).

The main reasons that general practitioners gave for their decision not to prescribe anticoagulants were history of recurrent falls (47.0%), cognitive impairment (22.6%), advanced age (16.4%), history of bleeding (10.9%), paroxysmal AF (7.6%), and substitution treatments recommended by a specialist (6.9%) (Table 4).

DISCUSSION

The prevalence of documented AF was 10.1% in a large cohort of more than 10,000 residents from a representative sample of 104 nursing homes. Approximately half of these very old individuals (mean age 87) received anticoagulants to prevent stroke.

The prevalence of AF in the study population was similar to data in the literature.¹⁶ Not surprisingly, these older adults with AF had many cardiovascular comorbidities, leading to a high risk of stroke based on CHA2DS2-VASc score (mean 5.1 ± 1.4). A recent systematic review showed that oral anticoagulation remains underused in

Table 2. Participant Clinical Characteristics Stratified According to Treatment

Characteristic	Anticoagulant User, n = 541	Anticoagulant Nonuser, n = 544	P
Age, mean ± SD	85.8 ± 4.9	88.3 ± 5.2	.01
Charlson Comorbidity Index, mean ± SD	7.4 ± 1.9	7.5 ± 1.92	.01
CHA2DS2-VASc	5.3 ± 1.4	4.9 ± 1.4	.001
Number of daily medications, mean ± SD	7.1 ± 2.4	6.1 ± 2.1	.001
Sex, n (%)			
Male	149 (27.5)	140 (25.7)	.50
Female	392 (72.5)	404 (74.3)	.50
Time since atrial fibrillation first diagnosed, yrs, n (%)			
<1	33 (6.1)	29 (5.3)	.10
1–5	180 (33.3)	188 (34.5)	.10
Unknown	328 (60.6)	327 (60.2)	.10
AF type, n (%)			
Paroxysmal	79 (14.6)	206 (37.9)	.001
Permanent	462 (85.4)	338 (62.1)	<.001
Malnourished, n (%)	106 (19.6)	166 (30.5)	.001
Cognitively impaired, n (%)	357 (66)	420 (77.2)	.001
Falls, n (%)	59 (10.9)	145 (26.6)	.001
Heart failure, n (%)	236 (43.6)	200 (36.8)	.02
Hypertension, n (%)	430 (79.5)	385 (70.7)	.001
Non-AF-associated arrhythmia, n (%) ^a	76 (14)	57 (10.5)	.046
Myocardial ischemia, n (%)	138 (25.5)	130 (23.9)	.54
Heart valve disease, n (%)			
Aortic stenosis	45 (8.3)	49 (9)	.69
Aortic insufficiency	24 (4.4)	23 (4.2)	.87
Mitral insufficiency	61 (11.3)	36 (6.6)	.02
History of stroke, n (%)	185 (34.2)	164 (30.1)	.15
Venous thrombosis, n (%)	87 (16.1)	55 (10.1)	.004
History of bleeding, n (%)	29 (5.3)	88 (16.1)	<.001
Diabetes mellitus, n (%)	139 (25.7)	87 (16)	<.001

^aAtrioventricular block, supraventricular tachycardia.

elderly adults (≥ 65) with AF who are at high risk of stroke.¹¹ The rate of anticoagulation in 54 studies conducted in different community populations ranged from 19% to 81.3%. In a recent cohort of 1,141 community-living elderly adults (mean age 70, 45.2% ≥ 75), 67% were taking warfarin. Although warfarin was discontinued within 1 year in 25.4% of these patients, 45.7% were still taking warfarin at the end of follow-up (3.4 years).¹⁷ This rate of anticoagulation was lower (42%) in another population of 429 individuals with AF selected from 21 long-term care homes.¹⁸

According to the literature, factors that affect anticoagulation prescription can be divided into two groups: patient dependent and physician dependent. Patient-dependent conditions that are favorable to prescription of anticoagulation treatment include younger age, history of

Table 3. Factors Associated with Withholding Anticoagulation: Multivariate Analysis

Risk Factor	OR (95% Confidence Interval)	P
Age	1.1 (1.01–1.17)	.02
CHA2DS2-VASc	0.90 (0.72–1.12)	.36
Paroxysmal atrial fibrillation	3.5 (1.83–6.66)	<.001
Malnutrition	0.76 (0.42–1.37)	.36
Cognitive impairment	0.77 (0.43–1.39)	.40
Falls	4.9 (2.4–9.9)	<.001
History of bleeding	3.62 (1.54–8.51)	.003

Adjusted for age, CHA2DS2-VASc (as continuous variable). The odds ratio (OR) is per year for age and per point for CHA2DS2-VASc.

Table 4. Prescriber Criteria Associated with Withholding Anticoagulation

Criterion	%
Falls	47
Cognitive impairment	22.6
Advanced age	16.4
History of bleeding	10.9
Paroxysmal atrial fibrillation	7.6
Alternative treatment	6.9

myocardial infarction,¹³ no history of severe bleeding,^{8,19} lower level of comorbidity, and preserved cognitive function.²⁰ A shared decision-making process with patients seems especially important for achieving good, long-lasting anticoagulation. Physician-dependent conditions include the clinician's own experience and environmental factors such as whether a specialist recommends initiation of anticoagulation treatment, which increases the number of treated individuals, especially in nursing homes.¹³

As previously reported, the current study found that older age, paroxysmal AF, history of recurrent falls, and severe bleeding were independently and significantly associated with withholding anticoagulation. These data are consistent with previous reports in community-dwelling populations or nursing home residents.²¹ Conversely, paroxysmal AF (present in ~26% of current study participants) was associated with a lower rate of anticoagulation therapy despite a demonstrated risk of stroke similar to that with permanent AF.²²

Recurrent falls were a strong and common cause for withholding anticoagulation treatment. Falls was defined as two or more fall episodes in the previous 3 months. According to this definition, the proportion of fallers in the cohort was approximately 20%, which might be an underestimation. Other authors have reported a prevalence of falls ranging from 50% to 75% in nursing home residents.²³ In another study, the number of recurrent fallers (≥ 1 episodes a year) remained underestimated in many cases.²⁴ Falls are common and are a major limiting factor for prescribing anticoagulants, especially for long-term treatment such as permanent AF,¹⁹ mainly because of associated risk of secondary cranial and extracranial hemorrhages when a fall is responsible for a head injury.²⁵ The results of our questionnaire that physicians caring for nursing home residents completed confirmed this medical

attitude of not prescribing anticoagulants in fallers, although in a review of more than 13,000 individuals eligible for anticoagulation treatment because of AF, the authors concluded that there were strong benefits of prescribing anticoagulants, with prevented stroke episodes significantly outnumbering risk of bleeding events.²⁶ In addition, other data suggest that fallers receiving anticoagulants, who are at high risk of traumatic intracranial hemorrhage²⁷ secondary to head injuries, would still benefit from anticoagulant therapy because of their concomitant high stroke rate, especially those with multiple stroke risk factors.²⁰

According to recent data, antiplatelet therapy is not recommended in AF because of a poor benefit:risk ratio. This recommendation is based on low levels of stroke prevention and high risk of adverse drug events, including digestive or major cerebral hemorrhage.^{25,28} In 10% of residents, despite a demonstrated high risk of bleeding, dual antiplatelet therapy was preferred to anticoagulants.^{29,30} Other factors, such as level of anticoagulation intensity and INR lability, are strong determinants of bleeding accidents.^{31,32} In our population, 22% of nursing home residents had labile INR, which is the most powerful factor associated with the estimated yearly risk factor of hemorrhage.¹⁵ Of conditions that may induce labile INR, drug-drug interactions (DDIs) and cognitive impairment are frequently listed. In the sample population, residents received on average 6.8 (range 0–18) different drugs each day, with an approximately 40% potential for DDIs. The proportion of residents with cognitive disorders, including dementia, was high (~70%) but not significantly different between anticoagulant users and nonusers.

Dementia is one of the factors that affects daily drug compliance even in controlled environments. This factor restricts anticoagulation prescription in nursing homes despite controlled delivery of medication and easier monitoring of INR. Despite a similar proportion of residents with dementia in the two groups, physicians listed cognitive impairment as the second cause for not prescribing anticoagulation treatment, which represents a paradox. The frequencies of dementia-related behavior and walking disabilities could be different between the two groups (with or without anticoagulants) and might result in many physicians not prescribing anticoagulants.

This study has several strengths and limitations. A large representative multicenter cohort was assembled, with more than 10,000 residents screened, 1,085 of whom had a history of AF. The challenge of anticoagulation prescription in a real-life setting was studied in a cohort of nonselected, very old, disabled nursing home residents. The daily practice of physicians caring for very old people with polypharmacy and multiple geriatric conditions such as falls and cognitive disorders was reported, rather than comparing patient management with published recommendations.

This study has several limitations. First, AF was defined in residents based on previous medical records without performing new electrocardiograms. Thus, it was not possible to ascertain whether AF was still present when data were collected from medical charts. The actual prevalence of AF might also be underestimated because systematic electrocardiography was not performed for all

residents at inclusion (especially those without previous history of AF). Second, and for the same reasons, because medical charts in nursing homes are heterogeneous, it was not possible to collect complementary data on associated diseases, such as heart failure, valvular heart disease, and stroke, and documentation of them (e.g., echocardiogram). Third, there were missing data related to the cross-sectional design of the study regarding past coexisting diseases or factors that might have existed when anticoagulants were first discussed on discovery of AF. Thus, disability levels (e.g., transferring and walking abilities), advanced dementia with productive behavior disorders, and assessment of individual risk factors of bleeding (especially labile hypertension and renal or hepatic function measures) were ascertained in fewer than 10% of residents at the time of initiation of anticoagulants. Finally, conditions or diseases that might represent past contraindications to anticoagulation (e.g., history of bleeding) and lead to inappropriate antiplatelet prescription were missing in many cases.

CONCLUSION

Although one in 10 nursing home residents has AF or a history of AF that should lead to the prescription of anticoagulation treatment, this treatment, which has been proven to prevent thromboembolic events, remains underused (50%). Advanced age, falls, history of bleeding, and paroxysmal AF were the most common conditions associated with withholding anticoagulation in multivariate analysis. For physicians caring for such individuals, geriatric syndromes such as falls and cognitive impairment, rather than age and history of severe bleeding, were the most frequent conditions leading to withholding anticoagulation in individuals with AF. Paroxysmal AF was considered to be a weak indication for anticoagulation prescription. Finally, despite recommendations, nursing home residents with AF were frequently prescribed antiplatelet agents as a substitute for anticoagulants.

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