


Management and Anticoagulation Treatment of Non-Valvular Atrial Fibrillation in Elderly Patients: The Dali Study

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Background: Non-valvular atrial fibrillation (NVAf) is associated with increased stroke in elderly populations, yet anticoagulant therapy is underutilized. We analyzed clinical characteristics and anticoagulation treatment rates of elderly NVAf patients hospitalized in Dali, China, to identify potential contributing factors.

Methods: We collected data for 155 elderly patients with NVAf aged ≥ 60 years, from July 01, 2020, to December 31, 2021. We analyzed the awareness rate, clinical characteristics, and anticoagulant treatment rate of atrial fibrillation (AF), and identified factors influencing treatment. Patients were followed up one year after discharge to assess vital status, cardiovascular events, and anticoagulation therapy status.

Results: Among 155 patients, 52.26% were female, and the average age was 75.77 years. The awareness rate of AF was 47.74% at admission, and only 21.94% received anticoagulant therapy. After discharge, the rate of anticoagulant therapy significantly increased to 70.97%, and 89.09% used new oral anticoagulants. Thromboembolic history and persistent AF predicted anticoagulant therapy at discharge, while male gender, previous bleeding history, and antiplatelet therapy predicted non-anticoagulant therapy. Out of 133 patients who completed a one-year follow-up, 23.31% died, 3.01% had strokes, and 3.01% experienced bleeding. Anticoagulant therapy decreased to 51.96% during the follow-up year.

Conclusion: Our findings highlight the low awareness rate and anticoagulant treatment rate, and high mortality among elderly NVAf patients in Dali. The development of comprehensive intervention strategies is critical to standardize AF management and improve prognosis.

Keywords: non-valvular atrial fibrillation, awareness rate of atrial fibrillation, anticoagulant therapy, stroke, all-cause death

Introduction

Atrial fibrillation (AF) is a prevalent age-related disease that affects the elderly predominately. As countries enter into an aging society, the incidence of AF is on the rise and shows no signs of abating.¹ According to a 2010 Global Burden of Disease Study, there are an estimated 33 million patients diagnosed with AF worldwide. Trends suggest that this figure will surpass 8 million in the United States, and 9 million in China by 2050.^{1,2} Despite this, AF remains a widely overlooked arrhythmia in clinical practice, presenting a substantial burden on health care systems in high-income and low- to middle-income countries worldwide.^{3,4} Inadequate management of AF may lead to severe complications such as heart failure, stroke and dementia, posing further harm to patients' health. Moreover, AF can also reduce patients' quality of life significantly.⁵ Patients diagnosed with paroxysmal AF or persistent AF have been found to have a lower quality of life, including dimensions such as disease burden, overall life satisfaction, mental health, and physical function. The decline in quality of life has been comparable to that of heart failure and patients who have undergone coronary intervention.⁶

While some patients with AF may restore sinus rhythm with the aid of drug cardioversion, electrical cardioversion, or radiofrequency ablation, most require long-term heart rate control and anticoagulant therapy to prevent cardiovascular and cerebrovascular complications.^{7,8} AF significantly increases the risk of embolic stroke in patients, nearly five times more than patients without AF.⁹ Additionally, AF complicates the risk of heart failure and increases mortality in patients with myocardial infarction, identifying it as an independent risk factor for death.¹⁰ Furthermore, AF is an independent risk factor for dementia, independent of age, previous stroke, and other factors, and is more pronounced in younger and healthier individuals.^{11–13}

AF shares common risk factors with cardiovascular disease, including hypertension, diabetes, structural heart disease, smoking and alcohol consumption, obesity or overweight, hyperlipidemia, and physical inactivity.^{14–22} The incidence of AF combined with coronary artery disease (CAD) has been rising rapidly in recent years, and the two diseases have a strong correlation with many common risk factors. CAD can promote the development of AF, and AF is an independent risk factor for CAD. Patients with AF combined with CAD often have a poor prognosis.^{23–26} Optimal control of both diseases is key to improving outcomes. For example, statins used in CAD have been shown to reduce the incidence and burden of AF. Therapies aimed at reducing the burden of CAD, such as percutaneous coronary intervention or bypass graft surgery, have also been shown to significantly reduce the burden of concomitant AF and improve morbidity and mortality.²⁷ Similarly, therapies such as rate control in AF patients using β blockers or calcium channel blockers can significantly reduce coronary ischemia and myocardial oxygen uptake.²⁸

The Dali Bai Autonomous Prefecture of China is located in the frontier minority areas. The economy is underdeveloped, and radiofrequency ablation has not been widely adopted, leaving significant disparities between the management of AF in the region and that in more developed areas. Therefore, the objective of this study is to investigate the clinical characteristics of elderly patients diagnosed with non-valvular atrial fibrillation (NVAf) in Dali, to appraise the awareness rate of AF, antithrombotic and anticoagulant treatment modalities, and to analyze its influencing factors to provide a scientific basis for the management of local AF and formulation of health policy.

Methods

Study Population

We consecutively enrolled 208 patients aged ≥ 60 years with a diagnosis of AF who were hospitalized in the Department of Geriatrics at the First Affiliated Hospital of Dali University between July 1, 2020, and December 31, 2021, irrespective of the reason for their hospitalization. Patients who did not originate from Dali ($n = 40$), those with valvular AF ($n = 11$), and those with incomplete data ($n = 2$) were excluded. The remaining 155 patients were included in the final statistical analysis. After discharge, a one-year phone-call follow-up was conducted to explore patients' vital status, anticoagulant therapy, incident stroke, bleeding events, surgery, and readmission to the hospital. This study was approved by the Ethics Review Committee of the First Affiliated Hospital of Dali University (NO. DFY202006001), and patients provided written informed consent. The study protocol conforms to the ethical guidelines of the 2013 Declaration of Helsinki.²⁹

Data Collection

Patient information was collected, including gender, age, nationality, height, weight, occupation, and history of smoking and drinking. Previous medical history, including pre-admission diagnosis, was obtained, and other medical history such as antithrombotic and anticoagulant therapy usage, bleeding history, stroke history, surgical treatment, medications, hypertension, diabetes mellitus, CAD, chronic obstructive pulmonary disease, thromboembolic disease, heart failure, hyperthyroidism, and liver and kidney diseases were gathered from medical records and telephone questionnaires. Fasting venous blood was collected to measure various indicators, including liver function, kidney function, blood sugar, blood lipids, electrolyte levels, blood routine, and coagulation function. Both CHA₂DS₂-VASC and HAS-BLED scores were calculated.³⁰

Relevant Definitions

Paroxysmal AF is defined as AF lasting up to seven days. Persistent AF is defined as AF lasting more than seven days but no more than 12 months. Permanent AF is defined as AF lasting for more than one year that cannot be terminated, or recurrence after termination of AF.³¹ In this study, persistent AF encompasses both persistent and permanent AF. Newly diagnosed AF refers to AF diagnosed during hospitalization without any prior history of AF. Stroke in this study refers to ischemic stroke. The bleeding history refers to previous instances of intracranial hemorrhage, gastrointestinal bleeding, nasal bleeding, oral bleeding, skin and mucosal ecchymosis, ecchymosis, and hemorrhoids bleeding that required hospitalization. Incident stroke refers to a stroke that occurred during the post-hospitalization to follow-up period. Incident bleeding refers to bleeding that occurs during the post-hospitalization to follow-up period. The New York Heart Association Cardiac Function Classification (NYHA) was used to classify heart function in this study.³² Thromboembolism includes pulmonary embolism, deep vein thromboembolism, and thromboembolism in other parts of the body. Smoking was defined as continuous or cumulative smoking for 6 months or more during a patient's lifetime. The smoking index was calculated as the product of the number of cigarettes smoked per day and the number of years smoked. Drinking was defined as self-reported alcohol consumption by the patients.

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics Version 25.0 software. Normally distributed measurement data were expressed as mean \pm standard deviation, and an independent sample *t*-test was used for comparison between two groups. Non-normally distributed measurement data were presented as M (Q1, Q3), and a rank-sum test was used for comparisons between two groups. Count data were reported as frequency (n) or percentage (%), and either chi-square or Fisher's exact test was used for comparisons between two groups. The Cox proportional hazards model was used to analyze the predictive factors for anticoagulant treatment adherence and all-cause mortality one year after discharge in patients with AF. The statistical power of our study was determined to be 87%. The significance level was set at $P < 0.05$.

Results

Characteristics of the Study Population

The study analyzed 155 patients with NVAf, with an average age of 75.77 ± 7.51 years. Of the patients included in the study, 45 (29.03%) had a history of smoking, all of whom were male. The average smoking index was 722. Additionally, 22 patients (14.19%) reported a history of drinking, all of whom were male.

The study found that among the 155 patients with NVAf, the mean CHA₂DS₂-VASc score was 5.26 ± 1.55 , and the mean HAS-BLED score was 2.28 ± 1.10 . Among them, 94 patients (60.65%) had a CHA₂DS₂-VASc score ≥ 2 and HAS-BLED score < 3 , and 80.85% (76/94) received anticoagulant treatment. Additionally, 61 patients (39.35%) had a CHA₂DS₂-VASc score ≥ 2 and HAS-BLED score ≥ 3 , and 63.93% (39/61) received anticoagulant treatment. Table 1 provides further details on this information.

The Awareness Rate of AF, Antiplatelet and Anticoagulant Treatment Rate of NVAf Patients on Admission

Among the 155 patients with NVAf, 81 (52.26%) were unaware of their AF upon admission, and 74 (47.74%) were aware. Only 34 patients (21.94%) received regular anticoagulant therapy upon admission, with 10 patients (29.41%)

Table 1 Distribution of CHA₂DS₂-VASc Score and HAS-BLED Score in the NVAf Patients

	Total	Anticoagulant Therapy	Non-Anticoagulant Therapy	P
CHA ₂ DS ₂ -VAsC-score ≥ 2 and HAS-BLED score < 3	94/155 (60.65%)	76/110 (69.09%)	18/45 (40.00%)	0.31
CHA ₂ DS ₂ -VAsC-score ≥ 2 and HAS-BLED score ≥ 3	61/155 (39.35%)	39/110 (35.46%)	22/45 (48.89%)	

Abbreviation: NVAf, non-valvular atrial fibrillation.

being treated with warfarin and 24 patients (70.59%) receiving NOACs. Antiplatelet therapy was administered to 18 patients (11.61%), while 5 patients (3.23%) received a combination of anticoagulation treatment and antiplatelet therapy. One patient underwent radiofrequency ablation. Relevant details can be found in [Table 2](#).

The Rate of Anticoagulant Therapy and the Use of NOACs in NVAF Patients at Discharge

Upon discharge, 70.97% (110/155) of NVAF patients received anticoagulant therapy. 10.91% (12/110) of them received warfarin, while 89.09% (98/110) received NOACs. Among those receiving NOACs, 74.49% (73/98) were treated with rivaroxaban, and 25.51% (25/98) were treated with edoxaban. Additionally, 22.58% (35/155) received antiplatelet therapy, with 68.57% (24/35) being treated with aspirin and 31.43% (11/35) with clopidogrel. Moreover, anticoagulant therapy combined with antiplatelet therapy was observed in 7.10% (11/155) of the patients. More information can be found in [Table 3](#).

Table 2 Awareness and Treatment Rates of AF, Antiplatelet and Anticoagulant Use for NVAF Patients Upon Admission

	Total Number of Patients	N	Rate (%)
NVAF patients	155		
Knowing about AF		81	52.26 (81/155)
Not knowing about AF		74	47.74 (74/155)
Anticoagulant therapy	34		21.94 (34/155)
Warfarin		10	29.41 (10/34)
NOACs		24	70.59 (24/34)
Rivaroxaban		23	95.83 (23/24)
Dabigatran		1	4.17 (1/24)
Antiplatelet therapy	18		11.61 (18/155)
Aspirin		14	77.78 (14/18)
Clopidogrel		3	16.67 (3/18)
Aspirin + Clopidogrel		1	5.56 (1/180)
Anticoagulant + Antiplatelet therapy	5		3.23 (5/155)
Radiofrequency ablation	1	1	0.65 (1/155)

Abbreviations: AF, atrial fibrillation; NVAF, non-valvular atrial fibrillation; NOACs, New oral anticoagulants.

Table 3 Rates of Antiplatelet and Anticoagulant Treatment at Discharge in NVAF Patients and Usage of NOACs

	Total Number of Patients	N	Rate (%)
Anticoagulant therapy	110		70.97 (110/155)
Warfarin		12	10.91 (12/110)
NOACs		98	89.09 (98/110)
Rivaroxaban		73	74.49 (73/98)
Edoxaban		25	25.51 (25/98)
Antiplatelet therapy	35		22.58 (35/155)
Aspirin		24	68.57 (24/35)
Clopidogrel		11	31.43 (11/35)
Anticoagulant + Antiplatelet therapy		11	7.10 (11/155)

Abbreviations: AF, atrial fibrillation; NVAF, non-valvular atrial fibrillation; NOACs, New oral anticoagulants.

Comparison of Patients Receiving Anticoagulant and Non-Anticoagulant Therapy

Patients who received anticoagulant therapy at discharge had a higher prevalence of thromboembolic disease (17.27% vs 2.22%, $P = 0.023$), heart failure (76.36% vs 57.78%, $P = 0.021$), and persistent AF (41.82% vs 22.22%, $P = 0.021$) compared to those who did not receive anticoagulant therapy. However, patients receiving anticoagulant therapy had a lower proportion of coronary heart disease (20.00% vs 44.44%, $P = 0.002$), bleeding history (6.36% vs 33.33%, $P < 0.001$), and antiplatelet therapy (10.00% vs 53.33%, $P < 0.001$) (Table 4).

Binary logistic regression analysis showed that gender, thromboembolic disease, bleeding history, antiplatelet therapy, and persistent atrial fibrillation were influential factors in anticoagulant therapy. Thromboembolic disease (OR = 70.014, 95% CI 3.220–1522.320, $P = 0.007$) and persistent AF (OR = 4.052, 95% CI 1.172–14.007, $P = 0.027$) were significant predictors of anticoagulant therapy, with male patients (OR = 0.232, 95% CI 0.061–0.880, $P = 0.032$), bleeding history (OR = 0.014, 95% CI 0.002–0.098, $P < 0.001$), and antiplatelet therapy (OR = 0.048, 95% CI 0.013–0.168, $P < 0.001$) being predictors of non-anticoagulant therapy (Table 5).

Reasons for Non-Anticoagulant Therapy in NVAF Patients at Discharge

Among the non-anticoagulated patients with NVAF, 6 (13.33%) had a prior history of bleeding, 6 (13.33%) expressed concerns regarding the possibility of bleeding, 22 (48.89%) had a high risk of bleeding as indicated by the HAS-BLED score of 3 or more, 2 (4.44%) reported a lack of information provided by their physicians, 1 (2.22%) had recently undergone surgical treatment, 1 (2.22%) experienced severe thrombocytopenia, and 7 (15.56%) had an unknown etiology (Figure 1).

One-Year Follow-Up Study of Patients with NVAF After Discharge

A total of 133 patients (85.81%) were included in the one-year follow-up study of NVAF patients discharged from the hospital. Among these patients, the mortality rate was 23.31% (31/133), 53 (51.96%) received anticoagulant treatment, and out of those, 39 (73.58%) used NOACs. The heart failure readmission rate was 15.69% (16/102), and the incident stroke rate was 3.92% (4/102). Among the latter, three cases were not treated with anticoagulant therapy, one case was treated with anticoagulant therapy, and two

Table 4 Factors Affecting Anticoagulant Therapy at Discharge in NVAF Patients

	Total Number of Patients N=155	Anticoagulant Therapy N=110	Non-Anticoagulant Therapy N=45	t/χ^2	P
Age, years	75.77±7.51	75.30±7.31	76.93±7.94	1.231	0.220
Men, n (%)	74/155 (47.74)	50/110 (45.45)	24/45 (53.33)	0.795	0.373
BMI, kg/m ²	23.21±3.62	22.99±3.66	23.91±3.48	1.212	0.228
Hypertension, n (%)	76/155 (49.03)	52/110 (47.27)	24/45 (53.33)	0.469	0.493
Diabetes, n (%)	21/155 (13.55)	16/110 (14.55)	5/45 (11.11)	0.322	0.571
CAD, n (%)	42/155 (27.10)	22/110 (20.00)	20/45 (44.44)	9.660	0.002
COPD, n (%)	60/155 (38.71)	41/110 (37.27)	19/45 (42.22)	0.330	0.566
Thromboembolism history, n (%)	20/155 (12.90)	19/110 (17.27)	1/45 (2.22)	5.167	0.023
Heart failure, n (%)	110/155 (70.90)	84/110 (76.36)	26/45 (57.78)	5.354	0.021
Stroke history, n (%)	13/155 (8.39)	8/110 (7.27)	5/45 (11.11)	0.612	0.434
Bleeding history, n (%)	22/155 (14.19)	7/110 (6.36)	15/45 (33.33)	19.073	<0.001
Antiplatelet therapy, n (%)	35/155 (22.58)	11/110 (10.00)	24/45 (53.33)	34.303	<0.001
Newly diagnosed AF, n (%)	81/155 (52.26)	55/110 (50.00)	26/45 (57.78)	0.774	0.379
Paroxysmal AF, n (%)	18/155 (11.61)	10/110 (9.09)	8/45 (17.78)	2.348	0.125
Persistent AF, n (%)	56/155 (36.13)	46/110 (41.82)	10/45 (22.22)	5.314	0.021
Smoking, n (%)	45/155 (29.03)	33/110 (30.00)	12/45 (26.67)	0.172	0.678
Drinking, n (%)	22/155 (14.19)	16/110 (14.55)	6/45 (13.33)	0.039	0.844
CHA ₂ DS ₂ -VASc score	5.26±1.55	5.33±1.51	5.09±1.66	−0.866	0.388
HAS-BLED score	2.28±1.10	2.17±1.08	2.56±1.12	1.979	0.05

Abbreviations: NVAF, non-valvular atrial fibrillation; BMI, body mass index; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease; AF, atrial fibrillation.

Table 5 Multivariate Analysis of Predictors of Anticoagulant Therapy in NVAF Patients

	OR	95%CI		P
		Lower	Upper	
Men	0.232	0.061	0.880	0.032
≥75 years old	0.699	0.242	2.024	0.510
Hypertension	0.419	0.148	1.190	0.102
Diabetes	3.652	0.702	18.990	0.124
CAD	0.525	0.172	1.603	0.258
Heart failure	1.168	0.357	3.819	0.797
Stroke history	6.565	0.916	47.049	0.061
Bleeding history	0.014	0.002	0.098	<0.001
Thromboembolism history	70.014	3.220	1522.320	0.007
Antiplatelet therapy	0.048	0.013	0.168	<0.001
Persistent AF	4.052	1.172	14.007	0.027
Smoking	2.154	0.478	9.705	0.318
Drinking	1.338	0.247	7.244	0.735

Abbreviations: NVAF, non-valvular atrial fibrillation; CAD, coronary artery disease; AF, atrial fibrillation, CI, confidence interval.

cases were treated with antiplatelet therapy. The surgical treatment rate was 1.96% (2/102), out of which one case was treated with radiofrequency ablation, and the other with left atrial appendage occlusion.

Reasons for Non-Anticoagulant Therapy in NVAF Patients After Discharge

Out of the total discharged patients, only 53 received anticoagulant therapy one year after their discharge. Twelve patients with NVAF did not receive anticoagulation therapy at the time of discharge. Among the patients who discontinued anticoagulant therapy, 27.03% (10/37) were not aware of the need for long-term medication, while 24.32% (9/37) reported feeling ill and were unable to tolerate the medication. 10.81% (4/37) patients stopped taking the medicine after their symptoms improved, while 10.81% (4/37) had bleeding events and 5.41% (2/37) were worried about bleeding. Additionally, 5.41% (2/37) patients underwent surgical treatment, and 5.41% (2/37) experienced stomach discomfort after taking the medication. 5.41% (2/37) patients considered the medication to be expensive. Only 2.70% (1/37) patient faced difficulty in purchasing the medicine, and in one instance, the physician recommended discontinuing the medication.

Influencing Factors of Anticoagulant Therapy One Year After Discharge

Compared to the non-anticoagulant treatment patients, those received anticoagulant treatment were more likely to have a thromboembolic history (24.53% vs 2.04%, $P = 0.003$), a history of stroke (18.87% vs 4.08%, $P = 0.045$), and

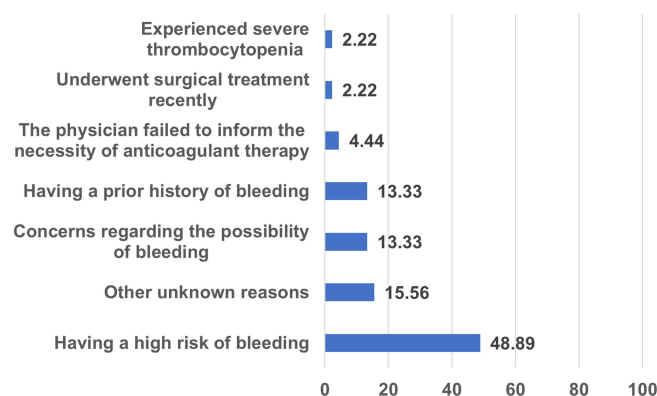


Figure 1 Reasons and Frequency for Non-Anticoagulant Therapy in NVAF Patients. The values presented in the figure are expressed as percentages (%).

Abbreviation: NVAF, non-valvular atrial fibrillation.

persistent AF (49.06% vs 18.37%, $P = 0.001$). The proportion of patients with CAD was lower in the anticoagulant treatment group (18.87% vs 42.86%, $P = 0.008$), as was the proportion with bleeding history (5.66% vs 22.45%, $P = 0.030$) (Table 6).

Our study conducted a Cox regression analysis to investigate the predictors of anticoagulation therapy in NVAF patients one year after discharge. The results presented in Table 7 show that age (HR = 1.063, 95% CI 1.013–1.115, $P = 0.012$), male gender (HR = 2.547, 95% CI 1.106–5.862, $P = 0.028$), and thromboembolism history (HR = 3.220, 95% CI 1.326–7.820, $P = 0.010$) were identified as statistically significant independent predictors of anticoagulation therapy. On

Table 6 Factors Affecting Anticoagulant Therapy in NVAF Patients One Year After Discharge

	Total Number of Patients N=102	Anticoagulant Therapy N=53	Non-Anticoagulant Therapy N=49	t/χ^2	P
Age, years	75.01±7.47	75.66±7.98	74.52±7.09	−0.839	0.403
Men, n (%)	44/102 (43.14)	21/53 (39.62)	23/49 (46.94)	0.556	0.456
BMI, kg/m ²	23.28±3.65	23.46±3.75	23.15±3.61	−0.427	0.670
Hypertension, n (%)	51/102 (50.00)	28/53 (52.83)	23/49 (46.94)	0.353	0.552
Diabetes, n (%)	16/102 (15.69)	8/53 (15.09)	8/49 (16.33)	0.029	0.864
CAD, n (%)	31/102 (30.39)	10/53 (18.87)	21/49 (42.86)	6.926	0.008
COPD, n (%)	38/102 (37.25)	23/53 (43.40)	15/49 (30.61)	1.780	0.182
Thromboembolism history, n (%)	14/102 (13.73)	13/53 (24.53)	1/49 (2.04)	9.057	0.003
Heart failure, n (%)	68/102 (66.67)	38/53 (71.70)	30/49 (61.22)	1.257	0.262
Stroke history, n (%)	12/102 (11.76)	10/53 (18.87)	2/49 (4.08)	4.033	0.045
Bleeding history, n (%)	14/102 (13.73)	3/53 (5.66)	11/49 (22.45)	4.725	0.030
Antiplatelet therapy when discharged, n (%)	21/102 (23.31)	7/53 (13.21)	14/49 (30.00)	3.676	0.055
Persistent AF, n (%)	35/102 (34.31)	26/53 (49.06)	9/49 (18.37)	10.639	0.001
Smoking, n (%)	29/102 (28.43)	12/53 (22.64)	17/49 (34.69)	1.818	0.178
Drinking, n (%)	16/102 (15.69)	5/53 (9.43)	11/49 (22.45)	3.261	0.071

Abbreviations: NVAF, non-valvular atrial fibrillation; BMI, body mass index; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease; AF, atrial fibrillation.

Table 7 Cox Regression Analysis of Anticoagulant Therapy in NVAF Patients One Year After Discharge

	HR	95%CI		P
		Lower	Upper	
Age	1.063	1.013	1.115	0.012
Men	2.547	1.106	5.862	0.028
Hypertension	1.095	0.525	2.285	0.808
Diabetes	0.932	0.380	2.288	0.877
CAD	0.565	0.253	1.265	0.165
COPD	0.854	0.439	1.662	0.642
Stroke history	1.963	0.796	4.839	0.143
Bleeding history	0.235	0.056	0.981	0.047
Anticoagulant therapy when discharged	0.289	0.099	0.844	0.023
Thromboembolism history	3.220	1.326	7.820	0.010
Persistent AF	2.191	0.963	4.987	0.062
Antiplatelet therapy when discharged	0.319	0.105	0.972	0.044
Smoking	0.500	0.182	1.375	0.500
Drinking	0.721	0.216	2.407	0.595

Abbreviations: NVAF, non-valvular atrial fibrillation; CAD, coronary artery disease; COPD, chronic pulmonary disease; AF, atrial fibrillation; HR, hazard ratio; CI, confidence interval.

Table 8 Cox Regression Analysis of All-Cause Mortality in NVAF Patients One Year After Discharge

	HR	95%CI		P
		Lower	Upper	
Age	1.057	1.005	1.111	0.031
Men	2.019	0.968	4.211	0.061
Hypertension	1.272	0.581	2.786	0.547
Diabetes	0.461	0.104	2.046	0.461
CAD	0.340	0.124	0.934	0.036
COPD	1.437	0.625	3.302	0.394
Stroke history	0.345	0.045	2.646	0.306
Bleeding history	1.311	0.504	3.412	0.579
Anticoagulant therapy when discharged	0.438	0.185	1.040	0.061
Persistent AF	1.424	0.609	3.328	0.414
NYHA IV	2.503	1.148	5.458	0.021

Abbreviations: NVAF, non-valvular atrial fibrillation; CAD, coronary artery disease; COPD, chronic pulmonary disease; AF, atrial fibrillation; NYHA IV, New York Heart Association functional classification class IV; HR, hazard ratio; CI, confidence interval.

the other hand, bleeding history (HR = 0.235, 95% CI 0.056–0.981, $P = 0.047$), anticoagulant therapy when discharged (HR = 0.289, 95% CI 0.099–0.844, $P = 0.023$) and antiplatelet therapy when discharge (HR = 0.319, 95% CI 0.105–0.972, $P = 0.044$) were identified as statistically significant independent predictors of non-anticoagulation therapy.

Determinants of One-Year All-Cause Mortality Among Patients with NVAF

A multivariate model was used to analyze various independent variables including age, gender, hypertension, diabetes, CAD, chronic obstructive pulmonary disease, stroke history, bleeding history, anticoagulant therapy, persistent AF, and NYHA cardiac function grade IV to determine the determinants of one-year all-cause mortality among patients with NVAF. The findings revealed that age (HR = 1.057, 95% CI 1.005–1.111, $P = 0.031$) and NYHA IV (HR = 2.503, 95% CI 1.148–5.458, $P = 0.021$) were statistically significant independent risk factors associated with all-cause mortality in NVAF patients (Table 8).

Discussion

The major findings of this study indicate a concerning lack of awareness of AF among elderly patients upon hospital admission. This results in a low rate of anticoagulation therapy for such patients, despite their increased risk of thromboembolic disease. Additionally, the high utilization of NOACs among patients receiving anticoagulation therapy suggests a preference for these drugs over traditional anticoagulant medications. Furthermore, the study identified thromboembolic disease and persistent AF as the most significant predictors of anticoagulation therapy at the time of discharge. However, the rate of anticoagulant therapy for NVAF significantly declined after one year of discharge, indicating the need for improved long-term treatment adherence and education for both patients and healthcare providers. Overall, these findings highlight the importance of increased NVAF diagnosis awareness and improved management strategies for elderly patients with NVAF to reduce their risk of thromboembolic events and improve long-term outcomes.

Our study found that the awareness rate of NVAF among hospitalized elderly patients in Dali, China, was low at only 47.74%, and the rate of anticoagulation therapy was also low at 21.94%. This is consistent with several other studies that have reported low rates of anticoagulation therapy in AF patients in China, including a study by Siu et al which reported an overall rate of anticoagulation therapy of only 22.8% in NVAF patients aged 80 years or older,³³ and a study by Guo et al which reported a rate of 26.4% in AF patients aged 85 years or older.⁸ The low rates of anticoagulation therapy in these studies^{8,33–35} and ours may be due to a lack of awareness among patients and healthcare providers about the importance of anticoagulation therapy for preventing stroke in AF patients, as well as concerns about the risk of bleeding

associated with anticoagulants in elderly patients. However, the most exciting finding was that the majority of NVAF patients were discharged with standardized anticoagulation therapy. This indicates that even geriatric physicians in tertiary hospitals located in remote areas of western China can adhere to guidelines and provide standardized anticoagulation therapy.

In contrast, our study found a high rate of NOACs use among patients receiving anticoagulation therapy, at 70.59%, while the rate of antiplatelet therapy was only 11.61%. This is similar to the findings of several other studies which have reported a trend towards increased use of NOACs and decreased use of antiplatelet therapy in NVAF patients,³⁶ including a study by Yu et al which reported a shift from antiplatelet therapy to NOACs in NVAF patients in China between 2012 and 2017. The study found that the use of NOACs was rapidly increasing, with rivaroxaban and dabigatran being the most frequently used. The average growth rates of overall visit and expenditure of OAC were 15.8% and 57.5%, respectively.³⁶ The higher rate of NOACs use in our study may be due to the fact that NOACs have been shown to be effective and safe in preventing stroke in NVAF patients,^{37,38} and therefore healthcare providers may be more likely to prescribe them.

Our study also found that thromboembolic disease and persistent AF were significant predictors of anticoagulation therapy at discharge, while male patients, previous bleeding history, and antiplatelet therapy were predictors of non-anticoagulant therapy at discharge. This is consistent with the findings of several other studies which have identified similar predictors of anticoagulation therapy in NVAF patients, including a study by Reynolds et al which identified a history of stroke or transient ischemic attack, heart failure as predictors of anticoagulation therapy,³⁹ and a study by DeWilde et al which identified male sex, previous bleeding history, and use of antiplatelet therapy as predictors of non-anticoagulant therapy.⁴⁰

Despite an increase in the use of NOACs in recent years, the anticoagulant treatment rate for NVAF remains low,^{37,41,42} highlighting the need to educate patients about the importance of anticoagulation therapy. Moreover, patient compliance with anticoagulant therapy after discharge was only 51.96%, which is significantly lower than the rate at discharge. Non-anticoagulant therapy is a common issue among elderly patients with AF, with various factors influencing treatment discontinuation.^{37,39,41} According to the present study, these factors may include lack of patient education on the importance of anticoagulation, inadequate physician-patient communication, financial constraints, fear of adverse events, and lack of follow-up and monitoring after discharge.

CAD is a well-known risk factor for thromboembolic complications in AF, and recent studies have supported this association.^{14,43} In fact, one study has suggested that CAD should be included in the “V” of the CHA₂DS₂-VASc score.¹⁴ The choice of antithrombotic agents for patients with CAD combined with AF depends on the clinical status of CAD. Recent studies have shown that in patients with chronic coronary syndrome combined with AF, NOACs alone are comparable in efficacy to combined NOACs and aspirin, but with the advantage of significantly lower bleeding risk. However, in patients with acute coronary syndrome, guidelines recommend combining P2Y₁₂ antiplatelet agents with oral anticoagulants (preferably NOACs) for at least 6–12 months, followed by continued use of oral anticoagulants only. For patients undergoing percutaneous coronary intervention (PCI), guidelines recommend triple antithrombotic therapy consisting of aspirin, a P2Y₁₂ drug, and NOACs for 1 month after PCI, followed by the combination of a P2Y₁₂ drug and NOACs for 6–12 months. After 1 year, most patients need to continue with oral NOACs only.^{44–46} In this study, 27% of patients had AF combined with CAD at discharge, but only 20% received anticoagulation and 7% received combined anticoagulation and antiplatelet therapy, which is lower than the recommended guidelines. The low rate of combined therapy may be due to concerns about bleeding risk. Future research is needed to investigate the effectiveness and safety of combined therapy in elderly patients with chronic CAD.

Our study has several strengths, including a comprehensive evaluation of clinical characteristics and anticoagulation therapy status. However, there are some limitations that need to be considered. A major limitation of this study is its single-center design and small sample size, which may limit the generalizability of our findings to other populations. In addition, the follow-up period of one year may not provide an accurate representation of the long-term outcomes of anticoagulation therapy in NVAF patients. Future studies should consider larger sample sizes with multi-center, and collect data on socioeconomic status, education level, and medical insurance types to provide a more comprehensive understanding of the factors that influence anticoagulant therapy.

Conclusions

Our study highlights the low awareness and low rate of anticoagulation therapy for NVAF among hospitalized elderly patients in Dali, China. Thromboembolic disease and persistent AF were significant predictors of anticoagulation therapy at discharge, while non-compliance was identified as a common issue. Future studies should include larger samples and multi-center designs to provide a more comprehensive understanding of influencing factors.

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Disclosure

The authors report no conflicts of interest in this work.

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