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Research Article

Investigation of atrial fibrillation frequency in relation to possible thromboembolic events in geriatric patients attending family medicine outpatient clinics

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ABSTRACT

Objective: Atrial fibrillation (AF) is the most common type of arrhythmia and is responsible for a large proportion of hospitalizations. In this study, we aimed to investigate the presence of atrial fibrillation(AF) without developing thromboembolic complications in patients who applied to family medicine.

Methods: The study included patients over 65 who applied to A University Training and Research Hospital and a State Hospital Family Medicine polyclinic. Those who had previously been diagnosed with AF were excluded from the study. Electrocardiography (ECG) was performed on patients over 65 who applied to our polyclinics to examine the frequency of AF. To assess the risk of thromboembolism, the CHA_2DS_2-VASc score was utilized. This score is a widely accepted and validated risk stratification system designed to predict stroke in patients with non-valvular AF.

Results: In a study involving 146 participants with a mean age of 73.86±7.38 years (61.6% female, 38.4% male), AF incidence was 11%. Isolated hypertension was the most common diagnosis, affecting 58% of patients with chronic diseases linked to AF. While AF was more prevalent in men (14.3%), the difference was insignificant (p=0.310). Most patients with AF (87.5%) had a CHA_2DS_2-VASc score of 2 or higher. The mean systolic blood pressure was 132.59±22.03 mmHg in non-AF patients compared to 124.00±21.62 mmHg in AF patients. A history of cardiac surgery and arrhythmias was associated with a higher incidence of AF (p=0.010).

Conclusion: The prevalence of AF in individuals over 65 years of age was found to be 11%, and the presence of comorbid disease was found to constitute the most important risk group. CHA_2DS_2-VASc score was two or above in 87.5% of patients and formed the high-risk group for stroke. In the study, patients with AF diagnosed before the development of thromboembolic complications were referred to the cardiology clinic for thromboembolic prophylaxis. This allowed the organization of cost-effective treatments based on bleeding risk scores and clinical indications. In primary health care services, every patient presentation should be evaluated effectively, and patients with symptoms and findings from a physical examination should be examined for AF.

Keywords: atrial fibrillation, thromboembolism, chronic disease, elderly

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Introduction

Atrial fibrillation (AF) is the most common type of arrhythmia and is responsible for a large proportion of hospitalizations.[1] The incidence of AF in the general population is 1-2%, increasing with age. AF is more common in men. AF can result in heart failure, ischemic stroke, and mortality. Ischemic stroke is one of the most critical complications of AF, causing mortality and morbidity.[2] Although the causes of AF include acute alcohol intake, surgical interventions, electric shock, pericarditis, myocarditis, pulmonary embolism, and hyperthyroidism, the most important causes are cardiovascular diseases such as valvular heart disease, heart failure, coronary artery disease, and hypertension accompanied by left ventricular hypertrophy.[3] In some recent studies, it has been mentioned that inflammation and obesity may also be associated with AF.While cardiovascular diseases are the primary causes of AF, various modifiable and non-modifiable factors associated with individual, family, and lifestyle characteristics also contribute to its development. Consequently, early identification and screening of at-risk individuals in primary care settings are crucial for public health.[4] Anticoagulant therapy recommendations according to ESC(European Society of Cardiology) AF treatment guidelines are shown in Table 1.

Our study aims to assess the frequency of AF through ECG(Electocardiography) screening in patients over 65 years of age who visit the family medicine outpatient clinic. We seek to highlight how this screening contributes to clinical practice. We hypothesize that the prevalence of AF in this patient group may be higher than anticipated, and that early diagnosis could be crucial in reducing morbidity and mortality.

The CHA_2DS_2VASc score calculates the risk of thromboembolism in patients with non-valvular AF. In this scoring, congestive heart failure, hypertension, advanced age, diabetes mellitus, female gender, stroke, and vascular disease accompanying AF are used in the calculation of stroke risk.[2,5,6] The primary target of AF treatment is to reduce cardiovascular mortality and morbidity. To this end, the treatment goals are to prevent thromboembolic events, improve quality of life through symptom control, and reduce hospitalizations. Anticoagulant therapy is the primary treatment method for preventing thromboembolic complications in all types of AF. Studies have shown that vitamin K antagonists (VKA) reduce the risk of stroke by 64% compared to placebo. Still, the INR (International Normalized Ratio) level should be closely monitored using VKAs.[7]

Published follow-up studies have shown that a substantial proportion of patients with AF do not receive anticoagulant therapy.[8] However, a large proportion of patients have thromboembolic complications or stroke. Mortality rates of patients with AF-induced thromboembolic events are

Table 1. Anticoagulant therapy recommendations according to ESC AF treatment guidelines

AF Risk Factor		Points
C	Congestive Heart Failure Left Ventricular Dysfunction	1
H	Hypertension	1
A2	Age ≥75	2
D	Diabetes Mellitus	1
S2	Stroke/Systemic Embolism	2
V	Vascular Disease/Previous MI/PAH/Atherosclerosis	1
A	Age 65-74	1
Sc	Gender Category (Female)	1
Recommendation		CHA_2DS_2-VASc Score
No Antithrombotic Therapy		0
Oral Anticoagulant Therapy		1*
Oral Anticoagulant Therapy		≥2

MI: Myocardial Infarction PAH: Pulmonary Arterial Hypertension.
*: Anticoagulant therapy is not recommended if 1 point is obtained from the Female gender category.

higher than those without AF. Although 20% of AF cases with ischemic stroke resulted in mortality and 60% in morbidity, the rate of receiving anticoagulant therapy remained below 50%.[9] Early diagnosis of patients with AF in primary care and early initiation of anticoagulant treatment are essential to prevent possible complications.

Materials and Methods

This is a cross-sectional analytical study. The study population consisted of patients over 65 who applied to the Ordu University Training and Research Hospital Family Medicine Clinic and the Aybastı State Hospital Family Medicine Polyclinic. The sample size was not calculated, and patients who used our polyclinics between Nov 1, 2021, and May 31, 2022, were included in the study. Those who had previously been diagnosed with AF were excluded from the study. It aimed to examine the frequency of AF by performing electrocardiography (ECG) in patients over 65 who applied to our polyclinics. ECG recordings were obtained using a standard 12-lead electrocardiography device. The dependent variable of our study was the presence of AF. Irregular atrial activation and rhythm with fibrillation waves on ECG were evaluated in favor of AF. The independent variables of our study were age, gender, blood pressure, and laboratory parameters. Blood pressure was measured from both arms in the sitting position after the patients had rested for 5 minutes. Measurements were made using a manual sphygmomanometer, and the average of the two measurements was recorded as the blood pressure value. No formal sample size calculation was conducted for this study. The sample included all eligible patients within the specified timeframe. However, since participants were recruited exclusively from two family medicine outpatient clinics, the findings may not adequately represent the broader population of older adults.

Laboratory assessments were conducted on all participants to evaluate their renal, thyroid, hematologic, and inflammatory status. The following parameters were measured: urea (mg/dL), creatinine (mg/dL), glomerular filtration rate (GFR, mL/min), thyroid-stimulating hormone (TSH, mIU/L), free thyroxine (T4, ng/dL), leukocyte count (µL), hemoglobin (g/dL), mean corpuscular volume (MCV, fL), platelet count (µL), and C-reactive protein (CRP, mg/L). The results of these tests were compared between patients with atrial fibrillation and those without, to identify potential associations.

In this study, AF was identified as the dependent variable. The sample consisted of all individuals over the age of 65 who visited the outpatient clinic during the study period, ensuring that the study population accurately represented this demographic. To assess the risk of thromboembolism, the CHA_2DS_2VASc score was utilized. This score is a widely accepted and validated risk stratification system designed to predict stroke in patients with non-valvular AF. Its validity and reliability have been confirmed in numerous studies.[5] The CHA_2DS_2VASc score is based on several clinical risk factors: congestive heart failure (1 point), hypertension (1 point), age 75 years or older (2 points), diabetes mellitus (1 point), prior stroke/transient ischemic attack/thromboembolism (2 points), vascular disease (1 point), age 65–74 years (1 point), and female sex (1 point). The total score can range from 0 to 9, with higher scores indicating a greater risk of stroke.

Statistical analyses were conducted using SPSS version 25. The normality of the variables was assessed using the Shapiro-Wilk test. Descriptive statistics are presented as means with standard deviations. Parameters that were not normally distributed were compared between groups using the Mann-Whitney U test. Differences between groups regarding chronic diseases were evaluated using the chi-square test.

The study was approved by the Clinical Research Ethics Committee of a Clinical Research and Ethic Comittee of Ordu University.

Results

The mean age of 146 participants was 73.86±7.38 years; 90 (61.64%) were female, and 56 (38.36%) were male. The incidence of AF on the ECG of the patients was found to be 10,96%. Isolated hypertension was the most common diagnosis of 104 (71.22%) patients with chronic diseases that may be associated with AF, with 32.19%. The presence of comorbidities (additional risk factors accompanying diabetes and hypertension) was 12.33%, and the presence of diabetes and hypertension was 8.90% among other common diseases. Laboratory results were analyzed to identify potential differences between patients with atrial fibrillation (AF-positive) and those without (AF-negative). No statistically significant differences were found in the levels of urea, creatinine, glomerular filtration rate (GFR), thyroid-stimulating hormone (TSH), thyroxine (T4), leukocyte count, hemoglobin, mean corpuscular volume (MCV), or C-reactive protein (CRP) between the two groups ($p > 0.05$ for all comparisons). Platelet levels were found to be statistically significantly higher among patients in the non-AF group compared to those with AF($p=0.035$). These findings suggest that, within our cohort, routine laboratory parameters were not significantly linked to the presence of atrial fibrillation (Table 2).

The mean age of patients with AF on ECG was 74.44±7.5 (years) compared to 74.44±6.53 in the group without AF ($p=0.743$). It was seen that male patients were diagnosed with AF at a higher rate than females (14.29%), but there was no statistically significant difference ($p=0.310$). The rate of accompanying hypertension in the group with AF was calculated as 68.75%. The mean CHA_2DS_2-VAS score of patients with AF was 2.94±1.24, and the median was 3 (max5-min1). 87.5% of patients with AF had a CHA_2DS_2VASc score of 2 or above. The mean systolic blood pressure (SBD) was 132.59±22.03 mmHg in the group without AF and 124.00±21.62 mmHg in the group with AF. Diastolic blood pressure (DBP) was 78.84±14.38 mmHg in the group with AF and 75.75±14.95 mmHg without AF. There was no statistically significant difference between the participants' mean systolic and diastolic blood pressure regarding AF presence. The incidence of AF was higher in patients with a history of cardiac surgery and arrhythmia compared to other chronic diseases. It constituted a statistically significant difference between chronic diseases and AF($p=0.010$). There was no statistically significant relationship between other chronic diseases and the presence of AF (Table 3).

Discussion

Our study examined the presence of AF in patients over 65 who applied to our polyclinics. The incidence of AF increases with age, and the risk of stroke increases with it. Follow-up and treatment of comorbid conditions that increase the risk of AF development play an important role in AF prevention. Thromboembolism prophylaxis is the most essential part of treatment in AF patients. Primordial protection and primary prevention are of great importance in providing primary healthcare. In primordial and primary prevention, it is a priority to increase scanning methods to reach risk groups and prevent disease before it occurs.

The study was conducted during the COVID-19 pandemic, and therefore, hospital admissions were low, resulting in a low number of patients included in the study. Thus, no generalization can be made in the light of the available data. The mean age of 146 participants was 73.86±7.38 years; 90 (61.64%) were female, and 56 (38.36%) were male. In the cohort study of F. Russel Quinn et al. in 22 family medicine centers in 2016, the mean

Table 2. Clinical characteristics of the patients who participated in the study

Clinical Characteristics		Average	Standard Deviation	n (%)
Age (years)		73.86	7.38	
Gender	Female			90 (61.64)
	Male			56 (38.36)
Chronic Diseases	None			42 (28.78)
	Diabetes			12 (8.23)
	Hypertension			47 (32.19)
	Chronic Artery Disease			11 (7.53)
	History of Cardiac Surgery			1 (0.68)
	History of Arrhythmia			1 (0.68)
	Congestive Heart Failure			0 (0.0)
	Valvular Heart Disease			1 (0.68)
	Comorbid Disease			18 (12.33)
	Presence of Diabetes and Hypertension			13 (8.90)
ECG	No AF			130 (89.04)
	Has AF			16 (11.96)
Systolic Blood Pressure (mmHg)		131.84	22.02	
Diastolic Blood Pressure (mmHg)		78.57	14.37	
Laboratory Parameters	Urea (mg/dL)	34.03	16.96	
	Creatinin (mg/dL)	0.89	0.32	
	GFR (mL/min)	75.32	19.73	
	TSH (mlU/L)	2.40	2.61	
	T4 (ng/dL)	1.18	0.22	
	Leukocyte (µL)	6827.86	2385.54	
	Hemoglobin (g/dL)	12.84	1.87	
	MCV (fL)	87.90	5.45	
	Platelet (µL)	251.91	75.12	
	CRP (mg/L)	2.47	5.15	

GFR: Glomerular Filtration Rate TSH: Thyroid Stimulating Hormone MCV: Mean Corpuscular Volume T4: Thyroxine CRP: C-Reactive Protein ECG: Electrocardiography AF: Atrial Fibrillation

age was 73.7±6.9 years; 46.6% of the participants were male, and 54.4% were female.[10] In the study, the mean age of patients with AF was higher, with a significance rate of $p<0.01$. A study conducted by Karaçağlar et al. in 2010 determined that 71.6% of patients with AF were 65 years and older.[11] In our study, the mean age of patients with AF (74.44±6.53) was higher than those without AF (73.79±7.50), although not statistically significant. AF increases with age, which is supported by the data we found. In the study of Karaçağlar, 58.5% of the patients with AF were female. In the Turkish Adult Risk Factor study conducted in Turkey, it was observed that the incidence of AF was 1/7 less in men than in women. The Turkish Adult Risk Factor study is Turkey's most comprehensive AF prevalence and incidence study. This study found that the prevalence of AF in Turkey was lower than in Europe.[12] In the REALISE-AF study conducted in 866 centers in 26 countries, 73.9% of the patients were over 60, and 56% were male.[13] While the increase in AF with age was similar

Table 3. AF cases observed on electrocardiography by clinical characteristics of patients

		ECG						p
		No AF, N=130			Has AF, N=16			
		Average	SD	n (%)	Average	SD	n (%)	
Age(years)		73.79	7.50		74.44	6.53		0.743*
Gender	Female			82 (91.11)			8 (8.89)	0.310**
	Male			48 (85.71)			8 (14.29)	
Chronic Diseases	None			37 (88.10)			5 (11.90)	0.010**
	Diabetes			12 (100.00)			0 (0.00)	
	Hypertension			44 (93,62)			3(6.38)	
	Coronary Artery Disease			9 (81.82)			2 (18.18)	
	Comorbidity			16(76.19)			5(23.81)	
	Diabetes+Hypertension			12 (92.31)			1 (7.69)	
Systolic Blood Pressure (mmHg)		132.59	22.03		124.00	21.62		0.294*
Diastolic Blood Pressure (mmHg)		78.84	14.38		75.75	14.95		0.564*
CHA_2DS_2VASc		-	-		2.94	1.24		

*Mann-Whitney U Test **Chi-square test
ECG: Electrocardiography, AF: Atrial Fibrillation

in studies conducted in Turkey and worldwide, the difference in incidence in the female gender in Turkey and worldwide was attributed to differences in inflammation or blood pressure. These studies provide us with limited data, and more comprehensive studies are needed.

In our study, the incidence of AF on the ECG of the patients was found to be 10.96%. The prevalence of AF was found to be 9.1% in the study by Karaçağlar et al., while in the Rotterdam study, the prevalence of AF was found to be 5.5% at the age of 55 and above, reaching 17.8% at the age of 85 and above.[11] In an AF prevalence study conducted in a family medicine clinic in Canada, the incidence of AF was found to be 8.2% at the age of 60 and above, and it reached 18.22% at the age of 80 and above.[14] The incidence of AF was similar to studies conducted with similar age groups.

Isolated hypertension was the most common diagnosis of 104 patients with chronic diseases that may be associated with AF, with 32,19%. The presence of comorbid diseases (risk factors accompanying diabetes and hypertension) was 12.33%, and the presence of diabetes and hypertension was 8.90%, among other common diseases. In the group with AF, the incidence of hypertension was found to be 68.75%. In the Turkish Adult Risk Factor study, it was observed that hypertension accompanied AF in 65.7% of patients, followed by coronary artery disease in 44.8% and congestive heart failure in 13.4%.[12] In the REALISE-AF study, it was observed that the association of hypertension was 72.2%, the presence of dyslipidemia was 46.3%, congestive heart failure was 45.8%, obesity was 32.7%, and coronary artery disease was 32.3%.[13] In the AF study conducted by the European Society of Cardiology in 2005, it was found that 60% of the patients had a comorbid disease, with hypertension being the most common comorbid disease. In the study, the association of hypertension was found to be 47.5% and the presence of dyslipidemia was found to be 35.5%.[8] In the ROCKET-AF study,

the association of hypertension was found to be relatively high at 90.5%.[15] In studies conducted in Turkey and around the world, hypertension is the most common chronic disease accompanying AF. In another study, data indicated that prolonged exposure to high blood pressure may cause cardiac enlargement and structural and electrical deterioration, which may result in AF.[16] Our study was found to be compatible with the literature.

The mean SBP was 132.59±22.03 mmHg in the group without AF and 124.00±21.62 mmHg in the group with AF. The mean DBP was calculated as 78.84±14.38 mmHg in the group with AF and 75.75±14.95 mmHg in the group without AF. There was no statistically significant difference between the participants' mean systolic and diastolic blood pressure regarding AF presence. In the study of F. Russel Quinn, the mean SBP was 133.2±17.8, the mean DBP was 77.9±11.87 in patients with AF, and no significant difference was observed with those without AF.[10] In the REALISE-AF study, the mean SBP was 132.8±19.4, and the mean DBP was 79.8±11.4. Mean blood pressure was similar in studies conducted with similar age groups.

The mean CHA_2DS_2VASc score of patients with AF was 2.94±1.24, and the median was 3 (max5-min1). The score was two or higher in 87.50% of the patients.[13] In the study of Karaçağlar, it was seen that 87.2% of the patients had a score of 2 or higher.[11] In the study of F. Russel Quinn, it was seen that 91.6% of the patients had a score of 2 or higher.[10] To reduce the risk of thromboembolism in patients with a CHA_2DS_2VASc score of 2 and above, it is highly recommended to administer anticoagulant therapy. The patients included in our study were not receiving antithrombotic or anticoagulant therapy. Patients who were found to have AF in the ECG were referred to the Cardiology clinic for anticoagulant therapy.

In a large-scale primary care cohort study conducted by Khurshid et al. in 2023, the prevalence of atrial fibrillation (AF) was reported as 6.4% in individuals aged 65 to 69, rising to 28.5% among those aged 85 years and older. These findings clearly emphasize that age is one of the strongest determinants of AF development.[17] Globally, analyses based on GBD 2019 data revealed that between 1990 and 2019, the incidence of AF increased by approximately 1.1-fold, while mortality rose by 1.4-fold. This underscores that AF is not only a regional issue but also a growing global public health concern.[18] The GLORIA-AF registry highlighted the presence of distinct comorbidity phenotypes among AF patients, which vary in terms of anticoagulation strategies and long-term prognosis. This variation underscores the necessity for a personalized and patient-centered approach to AF management.[19] Similarly, Machado et al. demonstrated that integrated care models—including medical treatment, psychosocial support, and patient education—can reduce complications such as stroke and heart failure, while also improving the quality of life for patients with AF.[20] International guidelines from the ACC/AHA and ESC emphasize the importance of lifestyle modifications (such as dietary changes, increased physical activity, and alcohol reduction) and opportunistic screening in high-risk groups within primary care as essential strategies for AF prevention and early detection. This perspective is reinforced by a 2024 Medscape report, which highlighted the critical role of primary care physicians not only in diagnosing AF but also in managing it through blood pressure and diabetes control, as well as lifestyle interventions. Importantly, AF has been described as “not merely an arrhythmia, but a complex disease” that requires a multidisciplinary approach.[21] In 2024, Linz et al. reported that the lifetime risk of developing AF in individuals over 45 years old is as high as one in three to one in five. Both the European Society of Cardiology (ESC) and the U.S. Preventive Services Task Force (USPSTF) recommend opportunistic screening for individuals aged 65 years and older. This screening has been shown to detect

approximately 1.4% of previously undiagnosed AF cases.[22] These findings suggest that even simple ECG applications in primary care settings can lead to significant public health benefits. In our study, the prevalence of AF detected via ECG was 10.96%. Consistent with the findings of Linz et al. opportunistic screening proves to be a valuable method for identifying asymptomatic cases. Therefore, implementing low-cost and easily applicable screening strategies in primary care is crucial for the early detection of AF, prevention of complications, and reduction of the disease burden at the population level.

The most significant limitation was the small number of patients included in our study, as well as the inclusion of only those who applied to the family medicine outpatient clinic, which limited the generalizability of our findings to the broader population. Surveying the COVID-19 pandemic significantly reduced hospital admissions, resulting in even fewer patients. In addition, the single-center and short-term design of the study further restricts the strength and external validity of the conclusions

Conclusion

AF is the most common arrhythmia in Turkey and worldwide, and its incidence increases with age. In most patients, AF is detected during thromboembolic complications. Periodic screening of patients in the risk group may play an essential role in preventing thromboembolic complications before they occur. The ESC Guideline on AF screening, published in 2022, and the US Preventive Services Task Force report do not provide a definitive recommendation due to insufficient randomized controlled trials on unnecessary screening. The guidelines also warn about the cost of unnecessary tests and quaternary protection.[23,24] The frequency of AF is expected to increase with life expectancy. As life expectancy increases, there is an increase in comorbid diseases, which results in an exponential increase in risk factors.

Thromboembolic complications cause severe mortality and morbidity, leading to significant material and non-material problems. In our study, AF patients diagnosed before thromboembolic complications developed were referred to the cardiology clinic for thromboembolic prophylaxis. This allowed the organization of cost-effective treatments based on bleeding risk scores and clinical indications. In primary health care services, every patient presentation should be evaluated effectively, and patients with symptoms and findings from a physical examination should be examined for AF.

Ethical approval

This study has been approved by the Ordu University's Clinical Research Ethics Committee (approval date 07.10.2021, number 2021/222). Written informed consent was obtained from the participants.

Author contribution

The authors declare contribution to the paper as follows: Study conception and design: TD, GD; data collection: TD, MK; analysis and interpretation of results: TD, MM, GD; draft manuscript preparation: TD, DG, ÖE. All authors reviewed the results and approved the final version of the article.

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Conflict of interest

The authors declare that there is no conflict of interest.

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