Original article

Patients With Atrial Fibrillation in a Primary Care Setting: Val-FAAP Study

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A B S T R A C T

Objective: To assess the clinical characteristics of patients with atrial fibrillation in the primary care setting.
Methods: This was a 2-phase, cross-sectional, multicenter study: phase A assessed the proportion of atrial fibrillation patients assisted in primary care over 5 days; phase B analyzed atrial fibrillation patients' clinical characteristics and management.
Results: In phase A, 119 526 subjects (age 52.9 [15.2] years; 40.9% male) received primary care in participating centers; 6.1% had atrial fibrillation. This proportion increased with age, hypertension, and male sex. In phase B, we analyzed 3287 atrial fibrillation patients (age 71.9 [10.1] years; 52.3% male). Risk factors were hypertension (92.6%), hypercholesterolemia (70.6%), related cardiovascular disease, heart failure (21.3%), and ischemic heart disease (20.9%). Permanent atrial fibrillation was the most frequent type of atrial fibrillation (45.3%). Age and cardiac and renal diseases were related to permanent atrial fibrillation development. Although more than two-thirds of patients had a $CHADS_2$ score ≥ 2, about one-third of them were not taking anticoagulants; by contrast, 46.8% of patients with $CHADS_2=0$ were taking oral anticoagulants.
Conclusions: In primary care, 6.1% of patients had atrial fibrillation. Patients with atrial fibrillation had high comorbidity. Anticoagulant treatment is far from optimal for atrial fibrillation patients in primary care.

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Pacientes con fibrilación auricular asistidos en consultas de atención primaria. Estudio Val-FAAP

R E S U M E N

Introducción y objetivos: Identificar las características clínicas de los pacientes con fibrilación auricular atendidos en atención primaria.
Métodos: Estudio multicéntrico, transversal, de dos fases: la fase A estimó la proporción de sujetos con fibrilación auricular entre los pacientes atendidos durante 5 días en atención primaria; la fase B recogió información sobre el perfil clínico y el manejo de los pacientes con diagnóstico previo de fibrilación auricular.
Resultados: En la fase A se incluyó a 119.526 sujetos (edad, 52,9 ± 15,2 años; el 40,9% varones), de los que el 6,1% tenía fibrilación auricular, porcentaje que aumentaba con la edad, la hipertensión arterial y el sexo masculino. En la fase B se analizó a 3.287 sujetos con fibrilación auricular (edad, 71,9 ± 10,1 años; el 52,3% varones). Fueron frecuentes los factores de riesgo hipertensión (92,6%) e hipercolesterolemia (70,6%); también la enfermedad cardiovascular concomitante: insuficiencia cardiaca (21,3%) y cardiopatía isquémica (20,9%). El tipo de fibrilación auricular que apareció con mayor frecuencia es la fibrilación auricular permanente (45,3%). La edad y las enfermedades cardiaca y renal se asociaron con sufrir fibrilación auricular permanente. A pesar de que algo más de dos tercios tenían una puntuación $CHADS_2 \geq 2$, prácticamente un tercio no estaba anticoagulado. Por otro lado, el 46,8% de los pacientes con $CHADS_2$ 0 estaban en tratamiento con anticoagulantes orales pese a que no está indicado.
Conclusiones: Tienen fibrilación auricular el 6,1% de los sujetos que acuden a las consultas de atención primaria. Los pacientes con fibrilación auricular tienen una elevada comorbilidad. El tratamiento anticoagulante en la fibrilación auricular atendida en atención primaria dista mucho de ser óptimo.

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INTRODUCTION

Atrial fibrillation (AF) is the most common arrhythmia in clinical practice and has significant clinical and prognostic implications.[1] Given the close relationship between AF and age, an increase in the prevalence of AF is expected in the coming years. For example, the ATRIA (AnTicoagulation and Risk Factors in Atrial Fibrillation) study noted that while there are currently 2.2 million people in the United States with AF, this is expected to increase to 5.6 million by 2050.[2]

Moreover, AF is not static but can develop over time. It has been observed that more than three-quarters of those with paroxysmal AF develop permanent AF after 14 years of follow-up, and about 20% of patients with recurrent AF develop permanent AF after 4 years.[3,4] The AF leads to electrical, and later structural, atrial remodeling, which can result in permanent AF. Although a trigger factor can be identified initially, in later stages a substrate leads to AF being sustained over time.[5] It is therefore important to identify those factors or situations that facilitate AF development and persistence. Proper treatment could potentially reduce the likelihood of further recurrences or prevent AF from becoming permanent.

Different studies have identified several independent risk factors for developing recurrent or permanent AF. These include ischemic heart disease, heart failure, valvular heart disease, and high blood pressure.[6] From a population point of view, hypertension is the most important risk factor for developing AF. For example, the CARDIOTENS study showed that in Spain 66% of AF patients had a history of hypertension.[7,8]

Mortality in AF patients is about double that for those in sinus rhythm.[1] The most serious complication of AF is the development of a stroke, both for short-term prognosis and for the disabling effects it produces. Since the thromboembolic risk is the same, regardless of the type of AF (paroxysmal, persistent, or permanent) and whether it is symptomatic or not, it is important to know whether physicians in clinical practice adequately assess the thromboembolic risk of AF patients and whether the antithrombotic therapy is appropriate.[9]

The primary care (PC) physician plays a key role in the management of AF patients. Although some studies have examined the prevalence of AF in different settings, including PC,[7,8,10,11] for Spain we have little detailed data analyzing the clinical characteristics of patients treated in PC for AF, its prevalence, its relationship with cardiovascular risk factors, the factors related to evolution towards permanent AF, or its clinical management in this setting. The Val-FAAP study (for the characterization and evaluation of AF patients treated in PC) was implemented to investigate the clinical characteristics of AF patients in PC. Secondary objectives were to estimate the prevalence of AF in PC consultations, describe the characteristics of patients with AF and hypertension, determine which variables were associated with progression to permanent AF, and assess the antithrombotic treatment used according to the CHADS$_2$ score.

METHODS

This is a national, descriptive, epidemiological, cross-sectional study developed in the context of clinical practice. The study was designed in 2 simultaneous phases: phase A was to determine the proportion of subjects with AF in PC by counting all patients who were seen in PC over 5 days, and assessing the history of AF as documented by electrocardiogram results in medical records. Phase B described the characteristics of patients with a previous diagnosis of AF. In this phase, each researcher agreed to include a total of 4 patients who fulfilled the inclusion criteria: patients of both sexes, ≥18 years of age, previously diagnosed with AF by electrocardiography, and who had given informed consent in writing. The study was approved by the Fundació Jordi Gol i Gurina (IDIAP) Ethics Committee. It was conducted by 836 PC physicians throughout Spain. To ensure that the study was fair and representative of the whole country, the number of physicians chosen in each province was proportional to the number of inhabitants of the province; invited researchers were selected randomly. Physicians agreed to participate in the study after being informed in detail about the study objectives and methodology.

Patients were recruited between September 2009 and May 2010. A single visit was arranged to collect demographic/anthropometric and clinical data, as well as data from several additional tests (laboratory, electrocardiogram, and echocardiogram) performed 6 months prior to the visit. In addition, data were collected on the date of diagnosis as well as detailed patient characteristics from the visit immediately prior to the diagnosis of AF (prediagnosis information). The AF type was classified both at the time of diagnosis (whether patient were diagnosed at the visit [de novo] or referred with a previous diagnosis of paroxysmal, persistent, or permanent AF) and at the subsequent visit, according to the clinical guidelines in effect at the time of the study (2006).[1] The AF was identified as new onset (first episode of symptomatic AF or first diagnosis of asymptomatic AF), paroxysmal (spontaneous recovery ≤7 days, and often <24 h), persistent (lasting >7 days with no spontaneous recovery, reversed by pharmacological or electrical cardioversion), or permanent (underlying rhythm was AF and restoring sinus rhythm was either not possible or not indicated.)

Regarding definition of the different variables, overweight was defined as a body mass index between 25 kg/m^2 and 29.9 kg/m^2 and obesity ≥30 kg/m^2. A patient was considered to have dyslipidemia with one of the following indicators: total cholesterol >200 mg/dL, low-density lipoprotein cholesterol >130 mg/dL, high-density lipoprotein cholesterol <40 mg/dL, triglycerides >150 mg/dL, or receiving lipid-lowering therapy. For smoking, patients were classified as smokers, exsmokers <1 year, exsmokers ≥1 year, or nonsmokers. Physical activity was classified as sedentary (if the patient did no weekly exercise), moderate (some exercise 2 or 3 times a week) or active (playing sports or exercising more than 3 times a week). Renal failure was considered with an estimated glomerular filtration rate <60 ml/min/1.73m^2. Family history of premature cardiovascular disease was defined as the presence in first degree relatives of ischemic heart disease, cerebrovascular disease, or peripheral artery disease at <55 years for males and <65 years for women.

Left ventricular hypertrophy was defined according to the European societies of hypertension and cardiology guidelines 2007,[12] electrocardiographic criteria (Sokolow SV1+RV5-6>38 mm and/or Cornell product >2.440 mm/ms), or echocardiography (left ventricular mass ≥125 g/m^2 in men or ≥110 g/m^2 in women).[12]

The risk of stroke was evaluated using the CHADS$_2$ score. This scale assigns a value of 1 point for each of the following risk factors: congestive heart failure, hypertension, age >75 years, diabetes

mellitus, and 2 points for having a previous stroke. According to the scale, a value of zero is considered low risk, 1 is moderate risk, and ≥2 is high risk.[1]

Calibrated mercury sphygmomanometers or semi-automatic apparatus, as available, were used for measuring blood pressure. The patient was given 5 min of rest before 3 measurements were performed with the patient sitting; the average of the 3 determinations was taken as the result. Hypertensive patients were considered to have adequately controlled blood pressure if they met the European societies of hypertension and cardiology guidelines criteria (ESH-ESC) 2007[12]: <140/90 mmHg in the general hypertensive population or <130/80 mmHg in diabetes or renal failure patients.

Statistical Analysis

Because this was a descriptive study, sample size was calculated from a representative sample of the Spanish population seen in PC for AF. The CARDIOTENS[7] study found a prevalence of 4.80% for AF in PC units. A sample of 3451 patients was calculated to yield results representative of AF patients in Spain with an error rate of 0.9%.

The continuous variables were defined as mean (standard deviation), and qualitative variables as absolute and relative frequency. Statistical tests were performed depending on the nature of the variables. The relationship between categorical variables was analyzed using the chi-square test; if more than 20% of the cells had an expected frequency lower than 5, the Fisher's exact test was used. The McNemar test was used for comparison of paired samples; preexisting cardiovascular risk factors at diagnosis were compared with those measured at the visit after diagnosis. A comparison of continuous variables between patient groups was performed using the Student t-test. Statistical comparison between different types of AF was performed using parametric (ANOVA) or nonparametric (Kruskal Wallis) tests appropriate for continuous or ordinal variables, while the chi-square test or Fisher exact test, as appropriate, was applied to discrete variables.

All comparisons performed were descriptive, and the null hypothesis was rejected in all cases with an alpha error less than 0.05. All statistical analyses were performed using the statistical package SAS® system version 9.1 for Windows 2000 or later versions, where available.

RESULTS

For phase A of the study, 836 PC researchers saw a total of 119 526 patients (mean age 52.9 [15.2] years; 40.9% male) over 5 consecutive days. A total of 7260 had AF, yielding a frequency for this pathology of 6.1% (5.9-6.2, 95% confidence interval [95%CI]); AF was more common in men, 7.3% (95%CI, 7.1-7.5) vs 5.2% (95%CI, 5.1-5.4) in women. Furthermore, an age-related increase in AF was seen: 18-27 years, 0.27% (95%CI, 0.17-0.37); 28-35 years, 0.31% (95%CI, 0.21-0.41); 36-42 years, 0.79% (95%CI, 0.63-0.94); 43-49 years, 1.26% (95%CI, 1.07-1.46); 50-55 years, 2.12% (95%CI, 1.85-2.38); 56-61 years, 4.23% (95%CI, 3.86-4.59); 62-67 years, 7.3% (95%CI, 6.85-7.75); 68-72 years, 10.99% (95%CI, 10.39-11.59); 73-79 years, 14.39% (95%CI, 13.78-14.99); and 80-119 years, 17.56% (95%CI, 16.90 to 18.21), shown in Figure 1. AF was more common among hypertensive patients than in nonhypertensive ones (14% vs 1.9%, P<.001).

Phase B of the study included 3306 patients previously diagnosed with AF, of which 3287 were eligible for final data analysis. Table 1 summarizes the clinical characteristics of patients with AF. The high proportion of patients with cardiovascular risk

factors was notable, mainly hypertension (92.6%), hypercholesterolemia (70.6%) and sedentarism (53.7%), associated vascular disease (mainly heart failure, 21.3%), and ischemic heart disease (20.9%). With regard to hypertension, 60.2% of patients were well controlled. More than half of patients with AF had left ventricular hypertrophy (55.3%). The diagnosis of left ventricular hypertrophy in PC was carried out mainly by electrocardiogram (79.6%) and less frequently by echocardiography (36%).

The different types of treatment, overall and by AF type, are shown in Figure 2. Diuretics, digoxin, and oral anticoagulants (OAC) were most frequently prescribed in patients with permanent AF, whereas antiplatelet and antiarrhythmic agents were prescribed for paroxysmal/persistent AF.

Table 2 shows data on the type of AF at diagnosis and its evolution over time. The 2 most common types of AF at the time of diagnosis were permanent AF (45.3%) and newly diagnosed AF (24.8%). Among patients newly diagnosed with AF, most evolved to permanent AF (57.4%), while 61.3% of those who had a diagnosis of paroxysmal AF remained with this diagnosis. Finally, about half of persistent AF patients developed permanent AF, with the other half continuing with persistent AF.

The factors associated with progression to permanent AF, compared with the profile of patients who did not develop it, were older age (72.7 [10.0] years vs 69.1 [10.9] years, P<.0001), the presence of previous valvular disease (15.2% vs 10.1%, P<.01) and higher values of serum creatinine (1.01 [0.3] mg/dL vs 0.97 [0.3] mg/dL, P<.05). Among patients who progressed to permanent AF, a higher proportion of family history of cardiovascular disease was found (62.2% vs 48.6%, P<.0001), in particular, cerebrovascular disease (14.5% vs 7.9%, P<.0001), heart failure (21.9% vs 14.5%, P<.001), valvular disease (23.3% vs 14.2%, P<.0001), and kidney disease (12.6% vs 7.9%, P<.01). The serum creatinine values remained higher in the population of patients with permanent AF (1.03 [0.4] mg/dL vs 0.90 [0.3] mg/dL, P<.05).

The clinical characteristics of patients according to the presence of hypertension are shown in Table 3. Patients with high blood pressure generally had an increased prevalence of hypercholesterolemia, diabetes mellitus, metabolic syndrome, a sedentary lifestyle, and the presence of vascular disease (heart failure, ischemic heart disease, valvular heart disease, kidney disease, cerebrovascular disease, peripheral arterial disease, and advanced retinopathy); in those without hypertension, hypertriglyceridemia was more common. However, there were no differences with regard to smoking or a family history of premature cardiovascular disease.
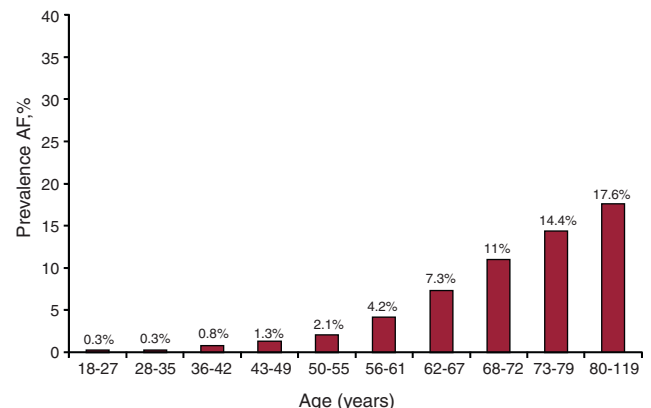

Figure 1. Presence of atrial fibrillation by age. AF, atrial fibrillation.

Table 1
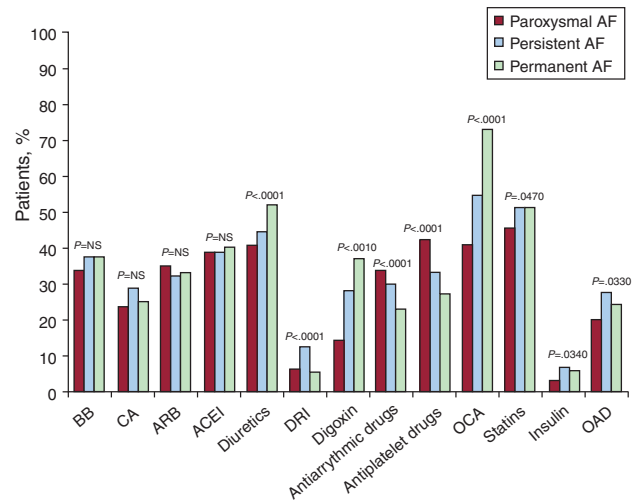Clinical Characteristics of Atrial Fibrillation Patients Treated in Primary Care

Biodemographic details	
Age, years	71.9 (10.1)
Sex (male), %	52.3
Body mass index	28.6 (4.5)
AF diagnosis time, years	4.6 (4.1)
Cardiovascular risk factors	
Hypertension, %	92.6
Hypercholesterolemia, %	70.6
Hypertriglyceridemia, %	38.6
Diabetes mellitus, %	33.7
Metabolic syndrome, %	32.6
Early AF CVD, %	14.5
Smoking, %	
Smoker	7.1
Exsmoker <1 year	5.9
Exsmoker ≥1 year	24.6
Nonsmoker	62.4
Physical activity, %	
Sedentary	53.7
Moderate	37.7
Active	8.6
Vascular disease, %	
Heart failure	21.3
Ischemic heart disease	20.9
Valvular disease	20.6
Slight	39.6
Moderate	43.3
Severe	17
Kidney disease	11.7
Cerebrovascular disease	11.1
Peripheral artery disease	9.6
Advanced retinopathy	2.9
Physical examination	
Systolic blood pressure, mmHg	
Hypertensive	137.5 (14.8)
Nonhypertensive	125.9 (10.1)
Diastolic blood pressure, mmHg	
Hypertensive	79.9 (9.5)
Nonhypertensive	75.5 (7.3)
Heart rate	77.2 (11.7)

AF, atrial fibrillation; AF CVD, family history of cardiovascular disease.

Figure 2. Current treatment by type of atrial fibrillation and for the overall sample. ACEI, angiotensin-converting enzyme inhibitors; AF, atrial fibrillation; ARB, angiotensin receptor blockers; BB, beta blockers; CA, calcium antagonists; DRI, direct renin inhibitors; NS, non significant; OAD, oral antidiabetics; OCA, oral anticoagulation.

Table 2
Type of Atrial Fibrillation at Diagnosis and Evolution Over Time

Classification of AF at diagnosis, %		Evolution, %	
New onset	24.8	Paroxysmal AF	26
		Persistent AF	16.6
		Permanent AF	57.4
Paroxysmal	16.5	Paroxysmal AF	61.3
		Persistent AF	9.1
		Permanent AF	29.6
Persistent	13.4	Paroxysmal AF	1.3
		Persistent AF	52.5
		Permanent AF	46.1
Permanent	45.3	Paroxysmal AF	0.1
		Persistent AF	1.1
		Permanent AF	98.8

AF, atrial fibrillation.

For thromboembolic risk, 4.5% of patients with AF had a CHADS$_2$ score of 0, 28.1% of patients scored 1 and 67.4% scored ≥2 (Table 4). OAC were prescribed for 46.8% of patients with CHADS$_2$=0, and 51.6% of patients with CHADS$_2$ ≥1, with 23.3% of the latter also taking oral antiplatelet agents. Of all patients with CHADS$_2$ ≥2, 57.0% took OAC and 19.3% antiplatelet agents (Fig. 3).

DISCUSSION

One of the main objectives of this study was to determine the prevalence of AF in PC. In the largest sample studied to date in Spain (almost 120 000 subjects, with a mean age of 52.9 years), the proportion of patients seen in PC with AF was 6%. There have been other studies of a smaller sample size in Spain estimating the prevalence of AF in patients seen in PC. For example, the CARDIOTENS study (mean age 68.4 years) reported 2.75% of subjects with AF in PC (vs 17.62% in specialist care); the BARBANZA study (mean age 54 years) reported 4%; the PREV-ICTUS study (mean age 71.9 years) reported 10.2%; and the FAPRES study (age 72.8 years) gave 10.3%.[7,10,11,13] In other words, the presence of AF in PC is high.[14] Moreover, as expected, the prevalence of AF increased with age, very significantly after the age of 60; it exceeded 7% in patients aged 62 years, and reached almost 18% in those over 80. The mean age was 53 years, and the number of subjects with AF is greater in older populations. In light of these data, it seems clear that the prevalence of AF in Spain will increase in the coming years due to the progressive aging of the population, with the consequent increase in associated costs.[15] Interestingly, almost all patients with AF seen in PC had a history of hypertension (92%), compared to 66% of patients diagnosed with permanent AF in the

Table 3

Clinical Characteristics of Patients According to the Presence of Hypertension

|	Without HPB	HPB	P
Cardiovascular risk factors			
Hypercholesterolemia, %	66	71	.0487
Hypertriglyceridemia, %	67.4	61	.0171
Diabetes mellitus, %	10.4	35.6	<.0001
Metabolic syndrome, %	14.6	34	<.0010
Early AF CVD, %	15	14.5	NS
Smoking, %			NS
Smoker	7.5	7.1	
Exsmoker <1 year	7.1	5.9	
Exsmoker ≥1 year	24.7	24.6	
Nonsmoker	60.7	62.4	
Physical activity, %			.0080
Sedentary	41.1	54.3	
Moderate	48.5	36.8	
Active	10.4	8.5	
Vascular disease			
Heart failure, %	6.1	22.5	<.0001
Ischemic heart disease, %	5.6	22	<.0001
Valvular disease, %	12.8	21.1	<.0001
Kidney disease, %	4.1	12.3	<.0001
Cerebrovascular disease, %	5.1	11.5	<.0001
Peripheral artery disease, %	5.1	10	<.0001
Advanced retinopathy, %	0.5	3	<.0001

AF CVD, family history of cardiovascular disease; HPB: high blood pressure; NS, non significant.

CARDIOTENS study; the percentage observed in the PREV-ICTUS study (92.1%) was very similar to our results.[7,11] Furthermore, a high percentage of patients with other cardiovascular risk factors and associated cardiovascular disease was observed, mainly heart failure (21%) and ischemic heart disease (21%). Along with the common presence of cardiovascular disease in AF patients, other studies have shown that the presence of AF is common in patients with heart failure and ischemic heart disease, indicating a close relationship between AF and these conditions.[16–18]

One of the most interesting and novel aspects of this study was to assess the clinical profile of patients who progressed to permanent AF in comparison with the profile of patients who did not. Factors associated with the development of permanent AF were older age, the presence of valvular heart disease, and cardiovascular or renal disease. In a Canadian study conducted in subjects with paroxysmal AF, it was found that factors associated with an increased risk of progression to permanent AF were increasing age, significant valvular disease (significant

Table 4

Percentage of Patients With Different CHADS$_2$ Scale Components

CHADS$_2$ Scale Variables	% Patients	CHADS$_2$ Score	% Patients
Hypertension	92.4	0	4.5
Age ≥75 years	44.7	1	28.1
Diabetes mellitus	33.7	2	31.6
Congestive heart failure	22	3	21
Previous stroke episode	13.9	>3	14.8
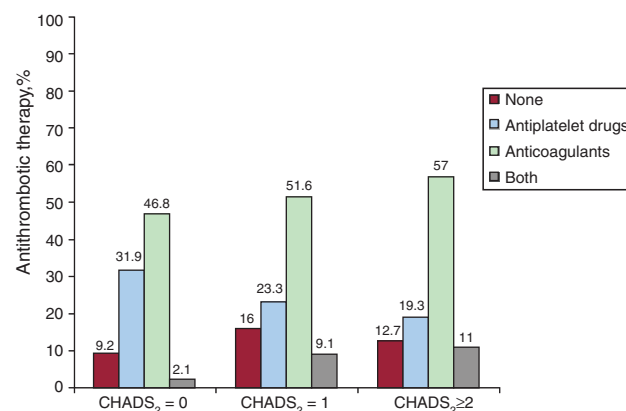
Figure 3. Antithrombotic therapy according to the CHADS$_2$ score.

aortic stenosis or mitral insufficiency), enlarged left atrium, and the diagnosis of cardiomyopathy. On the other hand, as in this study, a higher heart rate during AF reduced the risk of progression. This is probably because it was more symptomatic, and treatment was started earlier than in the cases of paucisymptomatic or asymptomatic AF.[19] These data indicate that to reduce the risk of permanent AF it is probably important to aggressively treat the different risk factors and cardiovascular disease associated with AF from the initial stages, to try to prevent the development of a substrate leading to the presence of AF.

There is a very close relationship between hypertension and AF. Hypertension produces a number of structural and electro-physiological changes in the heart that lead to the development of AF.[20] In our study, patients with hypertension and AF had more comorbidity than did patients without hypertension. This could partly explain the high risk of complications in subjects with both conditions.[21] For this reason, there is particular interest in preventing the development of AF in hypertensive patients. Although the most important factor here is to achieve adequate blood pressure control, it has been suggested that inhibition of the renin-angiotensin system may provide additional benefits in patients with hypertension and left ventricular hypertrophy or in those with heart failure.[22–24] Interestingly, those patients treated with direct renin inhibitors had fewer cases of permanent AF. For example, aliskiren may reduce the risk of paroxysmal or persistent AF becoming permanent. However, since this is a cross-sectional study with the limitations inherent to this type of registries, this potential can only be confirmed by a larger study designed specifically for this purpose.

As regards the thromboembolic risk, just over two-thirds of patients had a CHADS$_2$ score ≥2, so most AF patients seen in PC have a clear indication for OAC. However, almost one-third of patients with CHADS$_2$ ≥2 were not receiving anticoagulants. Numerous studies indicate that there is an underuse of OAC in patients with AF.[25,26] However, this study also found the opposite: nearly half of patients with a CHADS$_2$=0 were being treated with OAC when, according to the guidelines, there is no indication for anticoagulant treatment. There were also significant differences in the use of OAC according to the type of AF, as patients with permanent AF were more often prescribed OAC than patients with paroxysmal or persistent AF even though OAC indication should be independent of the type of AF.[1,9] It therefore seems necessary to improve the training of PC physicians regarding appropriate OAC indications in AF patients.

This was an observational, cross-sectional study, sufficient to establish both the frequency of AF and the clinical profile of AF patients seen in PC. However, it did not provide for prospective follow-up of patients and allowed only hypothesis generation about how a previous diagnosis could influence the occurrence of certain circumstances, such as the factors that may lead to the development of permanent AF. Prediagnosis data were based on patient history. While this may involve certain limitations, the researchers were urged to collect the data thoroughly, based on comprehensive clinical reports. Also, it was stressed that patients were to be recruited consecutively, but this instruction may not have been strictly followed. However, given the very high number of subjects, we believe that any breach of strict consecutive sampling would most likely not be significant. Since the study was conducted throughout the country, the results are applicable to subjects treated in PC in Spain, but not necessarily in other populations with different health systems or different clinical profiles.

CONCLUSIONS

Atrial fibrillation is present in 6.1% of PC patients. This percentage increases with age, male sex, and hypertension. Patients with AF have high comorbidity with numerous risk factors and associated cardiovascular diseases. The most common type of AF is permanent AF. Age and cardiac and renal diseases are associated with the development of permanent AF. Anticoagulant therapy in AF patients treated in PC is far from optimal. Although more than two-thirds of patients had a CHADS$_2$ score $\geq$2, almost one-third of them were not being treated with anticoagulants. Moreover, almost half of patients with a low risk of stroke (CHADS$_2$=0) were taking OAC even though such treatment is not indicated.

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CONFLICTS OF INTEREST

None declared.

REFERENCES

1. Fuster V, Rydén LE, Cannom DS, Crijns HJ, Curtis AB, Ellenbogen KA, et al.; ACC/AHA/ESC. 2006 guidelines for the management of patients with atrial fibrillation—executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation). J Am Coll Cardiol. 2006;48:854–906.

2. Go AS, Hylek EM, Phillips KA, Chang Y, Henault LE, Selby JV, et al. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention: the AnTicoagulation and Risk Factors in Atrial Fibrillation (ATRIA) Study. JAMA. 2001;285:2370–5.

3. Kato T, Yamashita T, Sagara K, Iinuma H, Fu LT. Progressive nature of paroxysmal atrial fibrillation. Observations from a 14-year follow-up study. Circ J. 2004;68:568–72.

4. Al-Khatib SM, Wilkinson WE, Sanders LL, McCarthy EA, Pritchett EL. Observations on the transition from intermittent to permanent atrial fibrillation. Am Heart J. 2000;140:142–5.

5. Khan IA. Atrial fibrillation: interaction between the trigger and the substrate. Int J Cardiol. 2003;87:301–2.

6. Benjamin EJ, Levy D, Vaziri SM, D'Agostino RB, Belanger AJ, Wolf PA. Independent risk factors for atrial fibrillation in a population-based cohort. The Framingham Heart Study. JAMA. 1994;271:840–4.

7. García-Acuña JM, González-Juanatey JR, Alegría Ezquerra E, González Maqueda I, Listerri JL. La fibrilación auricular permanente en las enfermedades cardiovasculares en España. Rev Esp Cardiol. 2002;55:943–52.

8. Mazon P, Cordero A, González-Juanatey JR, Galve E, Lekouna I, Facila L, et al.; investigadores del estudio CARDIOTENS. Impacto de la hipertensión arterial en las cardiopatías en España: evolución en la última década. Rev Esp Cardiol. 2010;63 Suppl 3:53 (A427).

9. Camm AJ, Kirchhof P, Lip GY, Schotten U, Savelieva I, Ernst S, et al. Guías de práctica clínica para el manejo de la fibrilación auricular (2.ª edición corregida). Rev Esp Cardiol. 2010;63:1483.e1–83.

10. Grupo Barbanza para el Estudio de las Enfermedades Cardiovasculares. Características de los pacientes con cardiopatías en un área sanitaria de la provincia de A Coruña. Estudio Barbanza 2000. Rev Clin Esp. 2003;203:570–6.

11. Cea-Calvo L, Redón J, Lozano JV, Fernández-Pérez C, Martí-Canales JC, Llisterri JL, et al.; investigadores del estudio PREV-ICTUS. Prevalencia de fibrilación auricular en la población española de 60 o más años de edad. Estudio PREV-ICTUS. Rev Esp Cardiol. 2007;60:616–24.

12. Mancia G, De Backer G, Dominiczak A, Cifkova R, Fagard R, Germano G, et al.; Grupo de Trabajo para el Tratamiento de la Hipertensión Arterial de la Sociedad Europea de Hipertensión (ESH) y de la Sociedad Europea de Cardiología (ESC). Guías de práctica clínica para el tratamiento de la hipertensión arterial 2007. Rev Esp Cardiol. 2007;60:968–94.

13. Morillas P, Pallarés V, Llisterri JL, Sanchis C, Sánchez T, Fácila L, et al. Prevalencia de fibrilación auricular y uso de fármacos antitrombóticos en el paciente hipertenso ≥ 65 años. El registro FAPRES. Rev Esp Cardiol. 2010;63:943–50.

14. Moro Serrano C, Hernández-Madrid A. Fibrilación auricular: ¿estamos ante una epidemia? Rev Esp Cardiol. 2009;62:10–4.

15. Ringborg A, Nieuwlaat R, Lindgren P, Jönsson B, Fidan D, Maggioni AP, et al. Costs of atrial fibrillation in five European countries: results from the Euro Heart Survey on atrial fibrillation. Europace. 2008;10:403–11.

16. Barrios V, Peña G, González JR, Alegría E, Lozano JV, Llisterri JL, et al. Hipertensión arterial e insuficiencia cardíaca en las consultas de Atención Primaria y de Cardiología en España. Rev Clin Esp. 2003;203:334–42.

17. Barrios V, Escobar C, Bertomeu V, Murga N, De Pablo C, Calderón A. Control de los factores de riesgo en los pacientes hipertensos con cardiopatía isquémica crónica atendidos en las consultas de cardiología. Estudio CINHTIA. Rev Clin Esp. 2008;208:400–4.

18. Barrios V, Escobar C, Echarri R. Atrial fibrillation and coronary heart disease: fatal attraction. J Atr Fibrillation. 2009;1:262–9.

19. Kerr CR, Humphries KH, Talajic M, Klein GJ, Connolly SJ, Green M, et al. Progression to chronic atrial fibrillation after the initial diagnosis of paroxysmal atrial fibrillation: results from the Canadian Registry of Atrial Fibrillation. Am Heart J. 2005;149:489–96.

20. Barrios V, De la Figuera M, Coca A. Prevención de la fibrilación auricular en el paciente hipertenso. Med Clin (Barc). 2007;128:148–54.

21. Vagaonescu TD, Wilson AC, Kostis JB. Atrial fibrillation and isolated systolic hypertension: the systolic hypertension in the elderly program and systolic hypertension in the elderly program-extension study. Hypertension. 2008;51:1552–6.

22. Wachtell K, Lehto M, Gerdts E, Olsen MH, Hornestam B, Dahlöf B, et al. Angiotensin II receptor blockade reduces new-onset atrial fibrillation and subsequent stroke compared to atenolol: the Losartan Intervention For End Point Reduction in Hypertension (LIFE) study. J Am Coll Cardiol. 2005;45:712–9.

23. Healey JS, Baranchuk A, Crystal E, Morillo CA, Garfinkle M, Yusuf S, et al. Prevention of atrial fibrillation with angiotensin-converting enzyme inhibitors and antengiosin receptor blockers: a meta-analysis. J Am Coll Cardiol. 2005; 45:1832–9.

24. Schneider MP, Hua TA, Böhm M, Wachtell K, Kjeldsen SE, Schmieder RE. Prevention of atrial fibrillation by renin-angiotensin system inhibition —a meta-analysis. J Am Coll Cardiol. 2010;55:2299–307.

25. Ogilvie IM, Newton N, Welner SA, Cowell W, Lip GY. Underuse of oral anti-coagulants in atrial fibrillation: a systematic review. Am J Med. 2010;123: 638–45.

26. Lip GY, Lane DA. Tratamiento anticoagulante y antiagregante plaquetario combinado en pacientes con fibrilación auricular. Rev Esp Cardiol. 2009; 62:972–5.