

Risk Factors for Stroke and Thromboprophylaxis in Atrial Fibrillation: What Happens in Daily Clinical Practice? The GEFAUR-1 Study

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Study objectives: We determine the risk for stroke of patients with atrial fibrillation in the emergency department (ED) and analyze the use of stroke prophylaxis in this setting.

Methods: This was a cross-sectional study carried out in 12 EDs. Clinical variables, risk factors for stroke, the prophylaxis prescribed, and the reasons for not initiating anticoagulation were collected. Risk factors and indications for therapy were evaluated according to the American College of Chest Physicians' 1998 recommendations.

Results: Of 1,178 patients included, 69% were not taking anticoagulants. Of the latter, 89% patients had indications for anticoagulation (age >75 years 59%, hypertension 56%, cardiac disorders 29%, heart failure 22%, diabetes 22%, previous embolism 14%), and 63% of the patients had 2 or more risk factors. Anticoagulation was prescribed in the ED to 27% of patients (67% with warfarin, 33% low-weight heparin plus warfarin), antiplatelets to 20% of patients, and no thromboprophylaxis to 53% of these eligible patients. Anticoagulants were prescribed in only 9% of patients with risk factors and current prophylaxis with antiplatelet agents. The main reasons for not prescribing anticoagulation in the presence of risk factors were advanced age (11%), contraindication for anticoagulation (27%), or because it was not considered to be indicated by the physicians (23%).

Conclusion: Most patients seen in the ED with atrial fibrillation are at high risk of stroke. Despite this risk, anticoagulation is underused in this setting, mainly because of the influence of advanced age on medical decisions and the reluctance to change current antiplatelet therapy.

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Editor's Capsule Summary*What is already known on this topic*

Prophylaxis for thromboembolism to prevent stroke is recommended in patients with atrial fibrillation. No studies have evaluated the role of emergency physicians in prescribing this prophylaxis.

What question this study addressed

How often do Spanish emergency physicians appropriately prescribe anticoagulants or antiplatelet agents for patients with atrial fibrillation?

What this study adds to our knowledge

In this study in Madrid, of 1,178 patients enrolled, 89% had indications for anticoagulation, but only 27% with risk factors for stroke were prescribed prophylaxis.

How this might change clinical practice

Strategies need to be developed to ensure the identification of emergency department patients in atrial fibrillation with risk factors for stroke and the efficient implementation of appropriate prophylaxis.

INTRODUCTION

Atrial fibrillation currently constitutes a growing public health problem because of its high prevalence and the coincident morbidity and mortality.¹ When arrhythmia coexists with determined risk factors,² it is the cardiac disorder most frequently associated with the development of arterial thromboembolism, which in 90% of cases manifests as ischemic stroke. Although several studies have demonstrated the effectiveness of oral anticoagulation for thromboembolism prophylaxis in atrial fibrillation³ and the indications for therapy are detailed in widely available clinical guidelines, in daily practice it is only prescribed to 15% to 44% of the patients for whom it is theoretically indicated.⁴

Profound changes have taken place in patient care in most developed countries during the past decades.⁵ Patients tend to abandon conventional health care routes and go directly to hospital emergency departments (EDs), which have become a main point of entry into the health system.⁶ ED practice differs greatly from the "ideal" conditions of clinical trials and constitutes an accurate reflection of the normal clinical practice in patients' risk profile, as well as in its management.⁷ Therefore, the study of thromboembolism prophylaxis in the ED can give an illustration of the real degree of the application of clinical guidelines and recommendations in daily practice, as well as the reasons offered for not following them, and can contribute to the knowledge about what interventions must be established to increase adherence to these guidelines.

The objectives of the Spanish Atrial Fibrillation in Emergency Medicine Study Group⁸ (GEFAUR-1) study were (1) to determine the risk profile (risk of stroke and risk of hemorrhage) of patients with atrial fibrillation in a representative scenario of routine ED practice; and (2) to analyze the prescription of anticoagulation as stroke prophylaxis and how often this prescription is in accordance with accepted guidelines and recommendations (American College of Chest Physicians' guidelines⁹).

MATERIALS AND METHODS**Study Design and Setting**

The GEFAUR-1 study was a cross-sectional, multicenter, observational study carried out in the EDs of 12 hospitals of the National Health System in Madrid, Spain, between June 15 and August 1, 2000, and was promoted by the Scientific Committee of the Spanish Society of Emergency Medicine. A detailed description of the GEFAUR-1 study methodology has been published elsewhere.⁸ The study protocol was approved by the Ethics Committee of the Spanish Society of Emergency Medicine. The protocol was blinded to guarantee patients' and physicians' confidentiality.

The population of the community (state) of Madrid was 5,205,408 inhabitants during the study period, distributed in 179 towns (6 of them with >100,000 inhabitants) and the city of Madrid (>3,000,000 inhabitants). Health care to this population is provided by 14 hospitals of the National Health System. Twelve of them joined the study (10 were teaching hospitals and 11 have residency programs). In Spain, emergency medicine is a "super-specialty" that can be joined after residency training in internal medicine, intensive care, anesthesiology, or family medicine/general practitioners. To be certified by the Spanish Society of Emergency Medicine, a period of work of at least 3 years in a board-certified ED after the residency is needed, followed by a nationwide examination (Certificate on Emergency Medicine). The 12 EDs that joined the GEFAUR-1 study were fully certified by the Spanish Society of Emergency Medicine and the National Health System. In our study, the EDs also included residents from different medical specialties. There were 67 staff emergency physicians and nearly 200 residents involved. Thus, although the treating physicians were not only emergency physicians but also residents, every management decision was supervised by at least 1 staff member of the ED.

During 2000, nearly 1,668,550 patients attended the EDs in Madrid (199,425 of the patients were admitted). Demographic characteristics and cardiovascular risk factors of the population of Madrid are similar to those of other cohorts from Spain and from most countries in western Europe.¹⁰

Selection of Participants

All patients who were older than 14 years, who were treated in the ED during the study period in the 12 hospitals, and in whom atrial fibrillation was demonstrated in an ECG¹¹ (obtained when the physician considered it necessary during clinical evaluation) were eligible for inclusion. Patients from pediatrics, obstetrics, psychiatry, orthopedics, otolaryngology, and ophthalmology were excluded (although if they were transferred to the medical area for consultation, they were available for inclusion). We included all episodes of atrial fibrillation and did not prevent reenrollment of patients. The diagnosis of atrial fibrillation and their types (paroxysmal and chronic [persistent or permanent]) was made prospectively by a staff emergency physician using criteria from the American Heart Association¹¹ and Levy et al,¹² respectively. Comorbidity was defined according to the criteria of the Framingham Heart Study¹³ (recently updated in the American Heart Association/European Society of Cardiology/American College of Cardiology guidelines on atrial fibrillation¹⁴). This information and the corresponding guides were submitted by the study coordination committee to the 12 hospitals and were available to the treating physicians during the study period. To ensure interobserver agreement, random samples were taken in all the hospitals, and the diagnosis of atrial fibrillation was confirmed in all the hospitals by the study coordination committee and by a staff cardiologist unrelated to the study group.

Data Collection and Processing

The treating emergency physicians prospectively filled out data forms for each patient, and a separate researcher reviewed the ED medical records daily to avoid recruitment losses and to confirm the data collected. The following information was included on the data collection sheet: demographic variables, structural heart disease, history of atrial fibrillation and its type (paroxysmal or chronic [persistent or permanent]), current thromboembolism prophylaxis, risk factors for thromboembolism, disability, risk factors for atrial fibrillation, the reason for attending the ED, the symptomatology and clinical evaluation in the ED, the duration of the current atrial

fibrillation episode (<48 hours, >48 hours, or unknown), whether cardioversion or rate control was attempted and if either was effective, the length of stay in the ED, the final patient disposition (discharge, observation, or admittance and the reason), and the thromboprophylaxis prescribed in the ED (anticoagulation [warfarin or low-molecular-weight heparin] or antiplatelet therapy [aspirin, clopidogrel or ticlopidine]). In patients for whom anticoagulation was indicated according to the American College of Chest Physicians recommendations,⁹ the treating physician was asked to answer the reason for not prescribing it from a set of multiple-choice possibilities: advanced age, disability, allergy, drug abuse (alcohol or illicit substances), poor therapeutic compliance, frequent falls, previous hemorrhage related to oral anticoagulants, potential risk of hemorrhage (active peptic disease, neoplasm, recent bleeding unrelated to anticoagulants, recent stroke, hemostasis disorder, or vascular or genitourinary diseases with a high risk of bleeding), recent surgery or severe trauma, patient's rejection, or not considered indicated. The variables on the data collection sheet were encoded according to a single table established by the study coordination committee.⁸ Copies of the GEFAUR-1 study protocol (including definitions, comorbidity, and codes) were provided to all the treating physicians.

Risk factors for stroke and indications for anticoagulation were defined according to the American College of Chest Physicians Fifth Consensus Conference on Antithrombotic Therapy⁹: history of thromboembolism (ie, ischemic stroke, transient ischemic attack, or systemic embolism in another location), structural heart diseases associated with embolism (ie, valvulopathy, dilated cardiomyopathy, moderately or severely reduced left ventricle fraction shortening, recent heart failure), older than 75 years, hypertension, diabetes, and thyrotoxicosis. A brief summary of risk-factor stratification and recommendations for therapy of the American College of Chest Physicians guidelines are listed in [Appendix E1](#) (available at <http://www.mosby.com/AnnEmergMed>). The determination of high, moderate, or low risk for stroke was done by the study coordination committee during the data analysis using the above-mentioned criteria.

Diagnoses of structural heart disease were accepted only if an echocardiogram was available in the patient's medical records. Disability was defined as dependence for the daily life activities: walking, feeding, washing, dressing, and continence. Depending on the capability to perform these basic activities and according to the Katz scale,¹⁵ patients were classified as totally independent (equivalent to Katz A), partially dependent

(corresponding to Katz B to F), and totally dependent (Katz G). The following were considered by the study group as factors that contraindicated anticoagulation in the ED: disability, frequent falls, uncontrolled hypertension, drug abuse (alcohol or illicit substances), inability to monitor treatment, allergy to anticoagulant therapy, recent major hemorrhage, previous bleeding related to anticoagulants, surgery or severe trauma during the previous 3 months, or potential high risk of hemorrhage (eg, neoplasm, gastrointestinal, vascular, genitourinary diseases with a high risk of bleeding).²⁻⁴ Major hemorrhage was defined as one with potential risk of death because of its location (eg, intracranial, gastrointestinal) or that required admission, surgery, or blood transfusion.² Therapeutic recommendations were not made; the treating physicians were free to decide the patients' treatment. No specific education about atrial fibrillation, risk factors for stroke, or the indications or contraindications for therapy was done by the study group during data collection.

Primary Data Analysis

Statistical analysis was done using SAS for Windows statistical software package (version 8.0, SAS Institute, Inc., Chicago, IL). Because of the characteristics and objectives of our observational study, data (ie, demographics, comorbidity, risk factors for stroke, clinical evaluation, management in the ED, patient disposition) are presented using descriptive statistics. Continuous variables are presented as mean \pm SD, and categorical variables are given as proportions.

To evaluate the homogeneity of the samples and the management among the hospitals, we compared only the demographic characteristics, previous diseases, risk factors for stroke, clinical presentation, evaluation in the ED, and patient treatment in the 12 EDs, using the χ^2 test for categorical variables and Student's *t* test for the continuous ones. This showed only small differences (without clinical relevance or implications for therapy) in the number of elderly patients within the health areas.

Each hospital reviewed the ED medical records daily to avoid protocol violations and to confirm the data collected. In addition, we performed an external monitoring study (2 investigators unrelated to the study group) in 2 hospitals (representative of teaching and nonteaching ones, as well as representative of EDs with and without the availability of cardiology consultation during the 24 hours) to confirm that there were no recruitment losses of clinical importance.

RESULTS

Characteristics of Study Subjects

During the study period, there were 66,146 visits to the ED medical areas, and 1,178 episodes of atrial fibrillation were included (3.6% of the medical emergency visits). There were no protocol violations of clinical importance in the recruitment; almost all episodes of atrial fibrillation in the 12 hospitals were included (only 11 eligible patients were missed, or the data collection forms were not accurately filled out). In the study population, the mean age \pm SD was 74.6 \pm 12.2 years, 55.6% of the patients were older than 75 years, and 702 (59.6%) of the patients were women. Baseline characteristics, treatment in the ED, and patient disposition are listed in Table 1. Some degree of disability was present in 21% of the patients, a figure that reached 28% in the population older than 75 years (36% of which were completely dependent). Bleeding related to previous antithrombotic treatment was responsible for the ED visit in only 0.8% of the cases and 1.8% of hospital admissions, whereas embolic events were responsible for 3.7% and 10.5% of hospital admissions, respectively.

The records of 894 (75.9%) patients showed a history of atrial fibrillation: 753 (63.9%) chronic and 139 (11.8%) paroxysmal. Of patients with previous episodes of atrial fibrillation, 842 (94.2%) had risk factors for thromboembolism (1 risk factor in 257 patients [28.7%], 2 in 291 [32.5%], and >2 risk factors in 294 [32.9%]) and, according to the guidelines, theoretical indications for anticoagulation. At their visit to the ED, 562 (62.9%) of these patients with previous diagnosis of atrial fibrillation and risk factors for stroke were receiving thromboembolism prophylaxis: 340 (38%) patients with anticoagulants, 217 (24.3%) patients with antiplatelets, and 5 (0.6%) patients with both treatments.

Risk factors for stroke in these patients with theoretical criteria for anticoagulation before ED attendance stratified according to risk category, the number receiving prophylaxis with anticoagulants recorded, and the distribution according to those risk factors are listed in the Figure.

There were 811 patients (68.8%) who were not taking anticoagulants when they visited the ED. Of these, 721 (88.9%) patients had risk factors for stroke and, therefore, theoretical indication for anticoagulation in the ED and constituted the target population (the anticoagulation-eligible group). These risk factors were age older than 75 years in 482 (59.4%) patients, hypertension in 453 (55.9%) patients, cardiac disorders in 233 (28.7%)

patients, heart failure diagnosed in the ED in 177 (21.8%) patients, diabetes in 176 (21.7%) patients, previous thromboembolism in 116 (14.3%) patients, and hyperthyroidism in 12 (1.5%) patients. Two or more of these risk factors were present in 63% of these patients (1 in 209 [25.8%] patients, 2 in 238 [29.3%] patients, and >2 risk factors in 274 [33.8%] patients). Anticoagulation was prescribed for 197 (27.3%) of these 721 eligible patients: 132 (67%) patients with warfarin and 65 (33%) patients with low-molecular-weight heparin in addition to warfarin. (Demographic and clinical characteristics of these patients are listed in Table 2.) The treating physicians prescribed antiplatelet agents for 145 (20.1%) of those anticoagulation-eligible patients, and no thromboprophylaxis was indicated in 379 (52.5%) of the patients.

Table 1.
Demographic and clinical characteristics of patients (1,178 cases).

Variable	No. of Patients (%)
Mean age, y ± SD	74.6 ± 12.2
Female sex	702 (59.6)
Disability	247 (20.9)
Totally dependent	113 (9.5)
Previous AF	894 (76)
Paroxysmal	143 (16)
Chronic	751 (84)
Risk factors for stroke	1,043 (88.5)
1	326 (27.7)
2	337 (28.6)
≥3	345 (29.3)
Type of risk factor for stroke	
Age >75 y	655 (55.6)
TE-SHD	553 (46.9)
Hypertension	670 (56.8)
Diabetes	259 (22)
Previous thromboembolism	188 (16)
Thyrotoxicosis	18 (1.5)
Heart failure in the ED	247 (23)
Current thromboembolism prophylaxis	619 (52.5)
Anticoagulants	361 (30.6)
Antiplatelet agents	252 (21.4)
Both	6 (0.5)
AF duration	
<48 h	247 (21)
>48 h Or unknown	930 (79)
Pulse rate >100 beats/min	482 (41)
Management	
Cardioversion attempt (AF <48 h)	119 (47)
Rate control (pulse rate >100 beats/min)	410 (66)
Length of stay in ED, h	5.6 ± 4.7
Patient disposition	
Admission	306 (26)
Observation	188 (16)
Discharge	683 (58)

AF, Atrial fibrillation; TE-SHD, structural heart disease with high risk of thromboembolism.

Risk factors for stroke in this anticoagulation-eligible group (those without current anticoagulation at the visit to the ED), stratified among groups of high, moderate, and low risk,⁹ the number of prophylaxis with anticoagulants prescribed, and its distribution according to those risk factors are listed in the Figure. Of these 721 anticoagulation-eligible patients, 202 (28%) patients were receiving antiplatelet agents at their visit to the ED, and anticoagulation was prescribed by the treating physicians to only 19 (9.4%) of the patients.

Anticoagulants were not prescribed despite the existence of risk factors for stroke in 524 (72.6%) of these 721 eligible patients. The reasons given by the treating physicians were contraindication for anticoagulation in 140 (26.7%) patients, no indication for anticoagulation in 118 (22.5%) patients, and advanced age in 57 (10.8%) patients; in 209 (39.8%) cases, a justification was not specified. No patient refused anticoagulation treatment. A summary of the contraindications for anticoagulation in patients with high risk of stroke is listed in Table 3.

LIMITATIONS

The main limitation of our study is that, as an observational study, no recommendations for therapy were made to the treating physicians. There are numerous guidelines on stroke prophylaxis in atrial fibrillation, with differences among them in risk stratification and in the indications for therapy. Thus, the use of any guideline as a standard for evaluation may be controversial. The American College of Chest Physicians' guidelines are widespread in our setting, they are published in a journal available in all the EDs of the study group, and they have little variation from other guidelines used.^{14,16} We believed that these guidelines would be a good tool to evaluate the attitudes about stroke prophylaxis in our EDs to determine whether an effort is needed to homogenize the management of atrial fibrillation in the different clinical settings involved. Despite this, in a number of cases the emergency physicians could be following the recommendations of guidelines different from those of the American College of Chest Physicians, and therefore, the number of patients with risk factors for stroke for whom prophylaxis was not prescribed could be different if other guidelines were used as standard for therapy.¹⁷

Another main limitation of this study is that, because of the heterogeneity of the large number of physicians involved, we could not use the physician as the unit of analysis. Moreover, stroke prophylaxis is a provider behavior, and in more than one third of the cases in which

anticoagulation was not prescribed, the treating physicians did not answer the reasons for not initiating therapy. In addition, most of the patients' cardiologists or family physicians did not initiate anticoagulation in the presence of risk factors for stroke. Although contraindications for anticoagulation were carefully evaluated by the study group, we could be underestimating them.

It is also possible that the conduct of the study and the completion of a data form about atrial fibrillation could have an effect on the treating physicians. They could be more concerned about this topic, and the number of patients for whom anticoagulation was prescribed may be higher than would normally be seen. Finally, diagnosis of structural heart disease was accepted only if an echocardiogram was available in the patient's records, which certainly underestimates the overall number of patients with cardiopathy and highlights the necessity of simple criteria for defining clinically relevant heart disease in the ED setting.¹⁶

DISCUSSION

The ED population reported is unique and represents an important cross-spectrum of patients, many of whom are not hospitalized. In contrast, most published reports focus on inpatient or office-based populations.^{2,3} In our series,

the prevalence of episodes of atrial fibrillation in the overall ED population is larger than previously reported.¹⁸ The reasons for this focus are unclear but may be related to the high frequency of ED use in our country and the increased prevalence of elderly patients with cardiovascular diseases.¹⁹

Our data show that almost all patients with atrial fibrillation who attended the ED had risk factors for thromboembolism and, therefore, indications for anticoagulation. Our patients' risk of thromboembolism is also higher than that documented in clinical trials^{2,4} because they are older and have a higher risk of stroke. More than 60% of the patients had 2 or more risk factors (the sum of factors multiplies the risk²), and the risk factors present are among those that increase the risk of stroke the most.³ On the other hand, the risk of hemorrhage in our patients (shown by the contraindications to anticoagulation) is similar to that stated in the majority of clinical trials.^{2,3} Thus, guidelines appear to be widely applicable in the acute setting, and the potential benefits of acting according to their recommendations would be greater than usually assumed. Despite this, anticoagulation was prescribed to only one quarter of the patients, many of whom had risk factors, and this prescription had no relationship to the presence and number of risk factors for thromboembolism. These data show that guidelines

Figure.

Stratified data according to risk categories of low, moderate, and high risk of stroke.*†⁹

High Risk (N=1,043)		Moderate Risk (N=63)		Low Risk (N=72)	
Previous AF (n=842) [†]	No Current ACO (n=721) [§]	Previous AF (n=29) [†]	No Current ACO (n=57) [§]	Previous AF (n=23) [†]	No Current ACO (n=33) [§]
167/503 (33.2)	Age >74 y 86/482 (17.8)	10/25 (40.0)	Age 65–75 y 1/10 (10.0)	5/23 (21.7)	Age <65 y 8/33 (24.2)
208/387 (53.7)	TE-SHD 53/233 (22.7)	4/8 (50.0)	CHD 1/5 (20.0)		
202/533 (37.9)	Hypertension 108/453 (23.8)				
82/216 (38.0)	Diabetes mellitus 42/176 (23.9)				
71/159 (44.7)	Previous TE 22/116 (19.0)				
4/16 (25.0)	Thyrotoxicosis 3/12 (25.0)				
—	Heart failure in ED 53/177 (29.9)				

ACO, Anticoagulation; CHD, coronary heart disease; TE, thromboembolism.
*See text for risk of stroke categories.
†A number of patients had >1 risk factor; therefore, the sum of the column could be more than the total number of patients.
‡In patients with previous atrial fibrillation (n=894; No. of patients with anticoagulants/No. of patients [%]).
§Patients without treatment with anticoagulants at their ED visit (n=811; No. of patients with anticoagulants prescribed in ED/No. of patients [%]).

are not systematically followed and that stroke prophylaxis with anticoagulants is underused in Spanish EDs, consistent with other studies in the hospital setting,²⁰ in general medical practice,²¹ in geriatric units,²² and recently, also in the ED.¹⁸

A main barrier for thromboembolism prophylaxis prescription reported in daily practice is physicians' distrust in the safety of anticoagulants,⁴ despite the reassuring data available in the literature,^{2,3,13,20,23,24} which could explain in part the low prescription of anticoagulants in this study. It has been stated that the main determinant of hemorrhage is the intensity of anticoagulation, the risk being notably increased with an international normalized ratio (INR) greater than 4,^{13,23,24} and that prophylaxis with anticoagulants is safe if an INR between 2 and 3 is achieved.¹²⁻²³ Our data support this statement about the favorable profile of anticoagulants: bleeding caused by current prophylaxis with anticoagulants was an uncommon cause of ED attendance and hospital admission compared with the higher number of both observed in stroke. Although there is some uncertainty about whether the benefits obtained with anticoagulants in controlled trials would be transferable to clinical practice,²⁵ the available evidence suggests that they would be. Despite the fact that in clinical practice patients receiving anticoagulants are older and have a greater number of risk factors, the benefit in relation to a reduction of the risk of stroke

continues, without a greater number of intracranial hemorrhages observed.²⁴

The emergency physicians tested apparently were not familiar with all the current indications for thromboembolism prophylaxis, which could contribute to the insufficient prescription of anticoagulants in our series and could explain the absence of a relationship between the indications of anticoagulation and the presence of risk factors for thromboembolism. When the reasons for not prescribing anticoagulation in those patients eligible according to the reference guidelines are analyzed, attention must be paid to the fact that physicians did not consider this treatment suitable in 24% of the patients who were eligible and did not have contraindications. As in other clinical settings, this viewpoint can be due to a lack of knowledge of the existing guidelines and to doubts about their applicability in daily practice and their effectiveness.^{4,25,26} This fact contradicts that expressed by the physicians surveyed in some studies, which suggests that such guidelines may help to reduce their uncertainty about the indications and effectiveness of anticoagulation.²⁷ As previously mentioned, the numerous existing guidelines vary in their recommendations, which could partially explain the results obtained if the physicians are using guidelines other than those of the American College of Chest Physicians (the rate of anticoagulation would vary as much as 13% to 100%, depending on the guideline used¹⁷).

Patient age is a major factor involved in the prescription of anticoagulants in almost all studies,^{4,20-22,24,25,28,29} and our data are consistent with that finding. Patients in

Table 2.

Demographics and characteristics of patients with risk factors for stroke and anticoagulation prescribed in the ED (197 patients).

Variable	No. of Patients (%)
Mean age ± SD	71.1 ± 11.9
Female sex	117 (59.3)
Disability	24 (12.1)
Previous AF	118 (59.8)
Paroxysmal	39 (19.7)
Chronic (persistent or permanent)	79 (40.1)
Previous antiplatelet therapy	19 (9.6)
AF duration	
<48 h	49 (24.8)
>48 h or unknown	148 (75.1)
Cardioversion attempt	23 (11.6)
Length of stay in ED, h	6.8 ± 7.0
Patients' disposition	
Admitted	63 (31.9)
Observation	21 (10.6)
Discharged	113 (57.3)

Table 3.

Contraindications for anticoagulation in patients with high risk for stroke and without current prophylaxis.

Causes	No. of Patients (%)
Disability	52 (37.1)
Major bleeding (unrelated to anticoagulants)	20 (14.2)
Recent stroke	12 (8.5)
High-risk bleeding (genitourinary/vascular)	12 (8.5)
Hemostasis disorders	10 (7.1)
Gastrointestinal disease	8 (5.7)
Allergy	8 (5.7)
Minor bleeding (unrelated to anticoagulants)	4 (2.8)
Frequent falls	4 (2.8)
Poor compliance	4 (2.8)
Neoplasm	2 (1.4)
Major bleeding (related to anticoagulants)	2 (1.4)
Minor bleeding (related to anticoagulants)	2 (1.4)
Total	140 (100)

routine practice are much older than those included in clinical trials, in which only 20% were older than 75 years² compared with more than 55% observed in our study. Prophylaxis is prescribed less often to patients older than 75 years, even though this is the group that benefits from it most^{2,3,9,13,23} and composes the majority of those treated in the ED for atrial fibrillation. This finding demonstrates the excessive impact of age on medical decisions and is probably related to the fear of a greater risk of hemorrhagic complications in this group of patients. Taking these recommendations into account, although the number of elderly patients included in the available studies is low, oral anticoagulation is safe and effective in this population group.^{28,29} The results of our study substantiate this assertion because only 28% of the elderly patients had contraindications for anticoagulation. On the other hand, advanced age is frequently assumed to be associated with disability, which may contribute to a reluctance to prescribe anticoagulants in this age group. Our data contradict this hypothesis because more than two thirds of the elderly patients had a sufficient level of independence. Therefore, it is not age but the hemorrhagic risk profile that should be decisive when stroke prophylaxis is indicated.

The low number of anticoagulant prescriptions in patients with current prophylaxis with antiplatelets could show the reluctance to change a treatment previously recommended by another health care professional, even when this change would be to a more effective one. This reluctance could be due to a lack of knowledge about the indications but also to distrust in the safety of the anticoagulants and the belief that antiplatelet therapy guarantees an adequate protection with a lower incidence of adverse effects, despite the available evidence.^{2,3,13,20,23,24}

In conclusion, most patients with atrial fibrillation who attend the ED are at high risk for stroke. Despite this risk, anticoagulation is underused in this setting, apparently because of an excessive effect of the patient's age on medical decisions and the reluctance to change current antiplatelet therapy. Although the patient's risk profile (risk for stroke and risk of bleeding) suggests that guidelines could be widely applicable in the ED, the prescription of prophylaxis in this setting does not follow established recommendations. Methods to improve compliance of emergency physicians to established guidelines are needed, including educational efforts and interventional studies to test the theoretical applicability and benefits. Because of the effectiveness of anticoagulation in stroke prevention and the large number of patients with risk factors for stroke treated in the ED, the application of

recommended guidelines in this setting could help to improve the prognosis and quality of life for a significant number of patients.

Author contributions: AM, CG, PL, and PG conceived and designed the study. AM supervised the conduct of the study and the data collection and was responsible for the design and codification of the data collection sheet. CG provided statistical advice on study design and the data analysis. CG, AM, and PL drafted the manuscript and take responsibility for the paper as a whole.

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APPENDIX.

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