Atrial fibrillation requiring urgent medical care. Approach and outcome in the various departments of admission. Data from the atrial Fibrillation/flutter Italian REgistry (FIRE)

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Key words:
Atrial fibrillation; Atrial flutter; Cardioversion; Digoxin; Epidemiology; Sinus rhythm.

Background. **The atrial Fibrillation/flutter Italian REgistry (FIRE) study was designed to obtain updated information regarding the clinical characteristics of and medical approach to patients requiring urgent medical care for atrial fibrillation (AF) or atrial flutter in a nationwide and representative series of hospitals.**

Methods. **4570 consecutive patients admitted to the emergency room for AF/atrial flutter were enrolled in 207 hospitals. Of these, 2838 (61.9%) were hospitalized (median 6 days, 43% in cardiology and 57% in internal medicine departments), and constitute the population of this study.**

Results. **AF/atrial flutter represented 1.5% of all emergency room admissions and 3.3% of all hospitalizations. The mean age was 70 ± 12 years; 89.9% had AF and 10.1% atrial flutter. In 31% of the hospitalized patients no cardiac disease was present, and in 18% no disease (either cardiac or non-cardiac) could be detected. Predictors of no attempt of cardioversion (37.5% of patients) included: onset of AF > 48 hours, heart failure, increasing age, syncope, admission to a non-cardiology department, stroke or transient ischemic attack (TIA). Predictors of in-hospital mortality (2.2%) included: age, heart failure, diabetes, admission to a non-cardiology department, and stroke or TIA. Predictors of the absence of sinus rhythm at discharge (35.6% of patients) included: no attempt of cardioversion, heart failure, chronic anticoagulation, AF duration > 48 hours, increasing age, stroke or TIA, and admission to a non-cardiology department. Transesophageal echocardiography was performed in only 6% of patients.**

Conclusions. **AF/atrial flutter represent a significant burden on the health care system with a higher than expected hospitalization rate from the emergency room. One out of three discharged patients is not in sinus rhythm. There is still a wide gap between evidence-based medicine and real practice in the treatment of patients with AF.**

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Introduction

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia. In addition to frequent disabling symptoms, the arrhythmia is associated with a 2-fold increased mortality, a 5-fold increased risk of stroke, a significant decrease in cardiac output and the development of a tachycardia-mediated cardiomyopathy in the absence of heart rate control[1-4].

Despite the increased interest due to the rising prevalence of AF and the greater awareness of its deleterious consequences, only few studies have attempted to assess the public health burden of the disease[5], or to characterize the various clinical presentations of patients with AF[6-8].

Also, despite the presence of guidelines, very limited data are available regarding the diagnostic and therapeutic strategies applied in patients with AF in everyday practice, often in settings very different from those experienced by the authors of the guidelines. The widest registry to date, the Canadian Registry of Atrial

Fibrillation (CARAF)[9], for instance, enrolled non-consecutive patients in six selected centers, thus setting the stage for a potential bias toward a higher standard of care.

The atrial Fibrillation/flutter Italian REgistry (FIRE) study was designed and undertaken with the following goals: to assess the number of admissions to the emergency room (ER) and hospital wards due to AF or atrial flutter; to evaluate the clinical profile of patients admitted for AF to the ER and/or hospital wards; to evaluate the diagnostic and therapeutic strategies followed for each admitted patient.

The present report will describe the overall population of the study and will focus on the patients hospitalized following admission to the ER for AF. It will also compare the course and outcome of patients admitted to cardiology with those admitted to internal medicine.

Methods

The study was undertaken under the auspices of the Italian Association of Hospital Cardiologists (ANMCO) and the Italian Society of Cardiology (SIC). Patients were consecutively enrolled during a period of 30 days, from January 17 to February 15, 2000, in 207 Italian hospitals (33% of the total number of Italian cardiology centers, representative of the overall situation both in terms of geographic distribution and of technical level). This assured a strict correspondence between the trial population and the universe of patients.

All patients evaluated in the ER because of AF were included, as were patients admitted to cardiology departments for a planned hospitalization. The total number of admissions to the ER and of hospitalizations were also recorded, to allow the assessment of the relative contribution of AF to the overall activity. The responsible investigators in each individual center daily filled the case report forms for the patients admitted to the ER. These contained relatively straightforward clinical and demographic information. The patients admitted from the ER to the hospital (urgent admission) were followed during their hospitalization, taking note of the ward of admission, and a more detailed case report form was filled.

FIRE enrolled patients of all ages and both sexes with AF as the main diagnosis requiring medical attention. Patients with chronic AF admitted for reasons not related to the arrhythmia were excluded as were those in whom AF manifested during hospitalization. Heart failure patients were included if AF was the reason for which medical attention was necessary because of its recent onset or associated symptoms. To allow uniformity in such a large-scale survey, two investigators who designed the protocol were continuously available as clinical help-line and all the data were carefully reviewed by a cardiologist trained in conducting clinical trials.

Statistical analysis. Categorical variables were compared using the χ^2 test or Fisher exact test, as appropriate. Continuous variables, reported as mean ± SD, were compared using the Student's t-test or analysis of variance. Differences between groups were presented as odds ratio (OR) and 95% confidence intervals (CI).

Multivariate logistic regression analysis was used to assess the independent predictors of mortality, of the likelihood of not undergoing cardioversion and of being discharged without sinus rhythm. The analyses were performed using the statistical package SAS, version 8.0 (Cary, NC, USA). A p value of 0.05 was considered the limit for significance.

Results

General population of patients. The study included 5764 patients: 1194 (20.7%) with a planned admission to a cardiology ward and 4570 (79.3%) who were managed in the ER.

AF or atrial flutter as the main diagnosis represented 1.5% of all ER admissions (4570 of 308 191 medical interventions). Of the patients with AF, 61.9% were hospitalized (2838 of 4570 patients), accounting for 3.3% of all the hospitalizations (2838 of 86 603 patients). Thus, the proportion of patients admitted to the ER who required hospitalization was significantly greater among patients with AF compared with the overall population of patients referred for other medical conditions [61.9 vs 27.6% (83 765 of 303 621 referrals), $p < 0.0001$].

The baseline characteristics of patients with AF managed in the ER are shown in table I. The mean age was 69 years and the time from arrhythmia onset to ER admission was < 48 hours in the majority of patients. Among the 4570 patients managed by the ER, 37.7% were discharged, 60.1% were admitted to hospital, 2.1% were transferred to other hospitals and 0.1% (5 patients) died. The present report will concentrate on the 2742 patients admitted to the hospital; of these, 43.1% patients were admitted to cardiology and 56.9% to other wards (for the overwhelming majority internal medicine). Overall, 92% of patients managed in the ER were still in AF at the time of their hospitalization.

Characteristics of the hospitalized patients. The demographics of the hospitalized patients were similar to those of the overall population of patients with AF/atrial flutter admitted to the ER. The characteristics of the presentation arrhythmia, the symptoms and the underlying disease are shown in table II, that also compares these variables between patients admitted to cardiology and those admitted to internal medicine. Quantitatively small, albeit statistically significant differences were

Table I. Baseline characteristics of patients with atrial fibrillation (AF) or atrial flutter (AFl) managed in the emergency room (ER).

No. patients	4570
Males	49.1%
Age	69 ± 13
> 70 years	51.6%
Systolic blood pressure (mmHg)	143 ± 25
Heart rate (b/min)	126 ± 34
Time from onset of symptoms to ER admission	
≤ 24 hours	59.7%
25-48 hours	7.8%
49 hours-30 days	11.9%
> 30 days	3.6%
Unknown	17.0%
Previous AF/AFl episodes	
None	32.2%
1-2	19.2%
3-5	9.6%
> 5	11.1%
Unknown	27.9%
Previous hospitalization	
No	27.6%
Yes	49.1% (45.8% of them for AF/AFl)
Unknown	23.3%

observed in the presentation arrhythmia, with more patients with atrial flutter admitted to cardiology, and in a few presentation symptoms including more palpitations among patients admitted to cardiology and more dyspnea and more neurological symptoms among patients admitted to internal medicine.

A cardiac condition only was more frequently present among patients admitted to cardiology compared with those admitted to internal medicine (55.4 vs 47.7, $p < 0.0001$) while the opposite occurred for the presence of solely a non-cardiac disease (8.9 vs 16.4, $p < 0.0001$). Both a cardiac and non-cardiac disease were present in 15.8 and 19.1% while no underlying disease was observed in 19.9 and 16.7% of patients admitted to cardiology and internal medicine, respectively.

Non-invasive diagnostic procedures. Among patients admitted to cardiology, 41.7% were hospitalized in an intensive or semi-intensive unit (with continuous ECG monitoring) whereas this occurred only in 2.6% of the patients admitted to internal medicine ($p < 0.0001$). Additionally, 17.6% of the patients in cardiology and 14% in other departments ($p = 0.015$) underwent a 24-hour Holter monitoring.

A chest X-ray was more frequently performed in patients admitted to internal medicine (86 vs 67%, $p < 0.0001$) and the same occurred for a vascular ultrasound (5.3 vs 3.7%, $p < 0.05$), whereas an echocardiogram (81 vs 60%, $p < 0.0001$ for a transthoracic and 9 vs 3% for a transesophageal echocardiogram, $p < 0.0001$, respectively), as well as exercise stress testing (3.7 vs 1.1%, $p < 0.0001$) were more frequently performed in cardiology. Thyroid function tests were performed in 34.3 and 35.4% of patients in cardiology and internal medicine, respectively.

Therapeutic approach. *Medical treatment.* The antiarrhythmic treatment used during the first 24 hours is shown in table III. Digoxin, the most frequently used drug, was significantly less prescribed in cardiology. On the other hand, the second and third most frequently prescribed agents, amiodarone and propafenone,

Table II. Baseline characteristics of patients hospitalized from the emergency room.

Variable	Cardiology	Internal medicine	Total	p
Male sex (%)	52.3	47.0	49.3	< 0.01
Age (years)	68 ± 12	72 ± 12	70 ± 12	< 0.0001
AF (%)	87.1	92.1	89.9	< 0.0001
AFl (%)	12.9	7.9	10.1	
Hypertension (%)	58.3	58.8	58.6	NS
Diabetes (%)	15.1	15.2	15.2	NS
Active smoker (%)	14.0	14.8	14.4	NS
Previous smoker (%)	15.3	12.7	13.8	
No symptoms (%)	3.1	3.1	3.3	NS
Palpitations (%)	73.0	66.2	69.2	0.0002
Rest dyspnea (%)	20.1	24.0	22.3	0.02
Effort dyspnea (%)	13.8	16.4	15.2	NS
CHF (%)	8.8	12.6	10.9	0.002
Fatigue (%)	10.0	10.0	10.0	NS
Angina (%)	10.1	8.1	9.0	NS
Pulmonary edema (%)	4.5	4.5	4.5	NS
Syncope (%)	2.5	3.9	3.3	0.05
TIA (%)	0.3	2.2	1.3	< 0.0001
Stroke (%)	0.3	1.4	0.9	0.006

AF = atrial fibrillation; AFl = atrial flutter; CHF = congestive heart failure; TIA = transient ischemic attack.

Table III. Antiarrhythmic agents prescribed during the first 24 hours.

Drug	Cardiology (%)	Internal medicine (%)	Total (%)	p
Digoxin	38.5	55.5	47.9	< 0.0001
Amiodarone	36.6	24.6	30.0	< 0.0001
Propafenone	25.2	21.3	23.1	< 0.02
Beta-blocker	5.1	5.1	5.1	NS
Quinidine	4.0	2.4	3.1	< 0.02
Flecainide	4.3	1.3	2.6	< 0.0001
Sotalol	2.2	1.9	2.1	NS
Ibutilide	1.1	0.07	0.5	< 0.0005
Disopyramide	0	0.07	0.04	NS

were more often used in cardiology. The medical treatment between the 25th hour and discharge from hospital closely paralleled the one above described.

The most prescribed cardiovascular non-antiarrhythmic drugs were: ACE-inhibitors (administered to 46 and 43.3% of patients in cardiology and internal medicine), diuretics (41 and 46% respectively) and nitrates (17.9 and 24.2% respectively). Antiplatelet and anticoagulant agents were more frequently administered to patients hospitalized in cardiology: antiplatelet agents were administered to 24.2 vs 20.3% of patients in internal medicine ($p < 0.02$), oral anticoagulants to 29.4 vs 24.3% ($p < 0.01$), and heparin to 36.9 vs 33% ($p = 0.04$). It should be pointed out that 13.2% of patients were already on chronic (> 30 days) anticoagulation at the time of hospital admission (15.3% among patients admitted to cardiology and 11.6% among patients admitted to internal medicine).

Cardioversion and additional procedures. Overall, a pharmacological cardioversion was attempted in 55.3% of patients, an electrical cardioversion in 10.4%, and either of the two in 62.5%. A pharmacological cardioversion was attempted in 61.5% of the patients admitted to cardiology, and in 47.1% of the remaining patients ($p < 0.0001$), and an electrical cardioversion was attempted in 17.4 and 5.1% of patients, respectively ($p < 0.0001$). Overall, at least one attempt to perform a cardioversion was made in 73.1% of patients admitted to cardiology vs 53.8% of those admitted to internal medicine ($p < 0.0001$).

This difference was observed both among patients admitted within 48 hours of the beginning of the arrhythmia (79.7 vs 67.3%, $p < 0.0001$) and among the remaining patients (57.8 vs 30.8%, $p < 0.0001$). Overall, the duration of the arrhythmia was correlated with the likelihood of an attempt of cardioversion, decreasing from 73.2% among patients admitted within 48 hours to 41.4% in the remaining patients ($p < 0.0001$). A multivariate logistic analysis was performed to assess the predictors of no attempt of cardioversion, including the variables: age, sex, previous AF episodes, duration of AF > 48 hours, presence of angina during AF, syncope, dizziness, diabetes, hypertension, presence of concomitant disease, stroke or transient ischemic attack (TIA), heart failure, chronic anticoagulation (> 30 days), and ward of admission (Table IV). An arrhythmia duration > 48 hours, heart failure, and increasing age were the strongest predictors. Also, patients admitted to cardiology had a 1.7-fold greater probability of undergoing cardioversion, confirming the independent predictive value of the ward of admission.

Overall, transesophageal stimulation was performed in 2.1% of patients (for all of them in the presence of atrial flutter), more frequently in cardiology (3.7%) than in internal medicine (0.7%, $p < 0.001$). An

Table IV. Multivariate predictors of no attempt of cardioversion.

Predictor	Odds ratio	95% confidence interval	p
Amiodarone use	0.218	0.174-0.272	< 0.0001
Onset of AF > 48 hours	2.984	2.420-3.681	< 0.0001
Heart failure	2.251	1.819-2.785	< 0.0001
Age	1.028	1.019-1.037	< 0.0001
Syncope	2.970	2.007-4.394	< 0.0001
Non-cardiology department	1.678	1.376-2.046	< 0.0001
Stroke or TIA	3.237	1.696-6.176	0.004
Diabetes	1.449	1.103-1.904	0.0078
Dizziness	1.404	1.066-1.848	0.0156
Angina	1.384	0.987-1.941	0.0597

Predictors are reported in order of decreasing statistical significance. AF = atrial fibrillation; TIA = transient ischemic attack.

electrophysiological study was performed in 1% of patients with a trend toward a greater frequency in cardiology. A permanent pacemaker was positioned in 1.9% of patients (3.6% in cardiology and 0.5% in internal medicine, $p < 0.0001$). Atrial flutter and atrioventricular junction ablation were each performed in 0.5% of the patients admitted to cardiology.

Patient outcome. The average hospital stay was 7 ± 6 days (median 6 days), and was shorter in cardiology compared with internal medicine (median 5 vs 7 days, $p < 0.0001$).

The overall in-hospital mortality was 2.2% (61 patients). The causes of death were cardiovascular in 41 cases (67%, an overall cardiovascular mortality of 1.5%), non-cardiovascular in 10 cases (16%), while in the remaining 10 cases death not be classified in either of the two.

A multivariate logistic analysis was performed to assess the predictors of in-hospital mortality and included the following variables: age, sex, diabetes, the presence of concomitant disease, stroke or TIA, heart failure, and ward of admission. Table V illustrates the results. As expected, age and diabetes were positively correlated with an increased mortality as was the presence of heart failure and of neurological symptoms. Interestingly, admission to internal medicine was associated with a 2.4 times greater risk of death.

Heart rhythm at discharge. Overall, 64.4% of the patients were discharged from hospital in sinus rhythm: 11.5% in AF with a scheduled cardioversion and 24.1% in AF with no definite program of rhythm restoration. At discharge, sinus rhythm was more frequently present among patients with a duration of AF < 48 hours compared with patients with a longer duration of the arrhythmia (75.3 vs 41.1%, $p < 0.0001$), and among patients admitted to cardiology compared with those admitted to internal medicine (73.4 vs 57.6%, $p < 0.0001$).

A multivariate logistic analysis was performed to assess the predictors of the absence of sinus rhythm at discharge and included the following variables: age, sex, previous AF episodes, a duration of AF > 48 hours, the presence of angina during AF, syncope, dizziness, diabetes, hypertension, the presence of concomitant disease, stroke or TIA, heart failure, chronic anticoagulation (> 30 days), in-hospital use of amiodarone, an attempt of cardioversion, and ward of admission (Table VI). As may be expected, the strongest predictor was an attempt of cardioversion, with an OR of 0.11. Strong predictors of the absence of sinus rhythm were age, the presence of heart failure, of stroke/TIA, of chronic anticoagulation, and a duration of AF > 48 hours. Admission to internal medicine was a strong independent predictor of the absence of sinus rhythm at discharge (OR 1.53, 95% CI 1.23-1.91, $p = 0.0002$). The ward of ad-

Table V. Multivariate predictors of in-hospital mortality.

Predictor	Odds ratio	95% confidence interval	p
Age	1.09	1.05-1.12	< 0.0001
Heart failure	2.33	1.26-4.30	0.007
Diabetes	2.11	1.18-3.78	0.01
Non-cardiology department	2.37	1.20-4.66	0.01
Stroke or TIA	3.22	1.14-9.14	0.03
Concomitant disease	1.16	0.15-9.04	0.89
Male sex	1.02	0.60-1.76	0.93

Predictors are reported in order of decreasing statistical significance. TIA = transient ischemic attack.

Table VI. Multivariate predictors of the absence of sinus rhythm at discharge.

Predictor	Odds ratio	95% confidence interval	p
Attempt of cardioversion	0.11	0.09-0.14	< 0.0001
Heart failure	3.32	2.63-4.19	< 0.0001
Chronic anticoagulants	2.70	2.12-3.43	< 0.0001
AF duration > 48 hours	1.97	1.57-2.64	< 0.0001
Age	1.03	1.02-1.04	< 0.0001
Stroke or TIA	4.33	2.16-8.69	< 0.0001
Non-cardiology department	1.53	1.23-1.91	0.0002
Angina	0.68	0.46-0.99	0.048
In-hospital amiodarone	1.25	0.98-1.59	0.07
Concomitant disease	1.67	0.95-2.93	0.07

Predictors are reported in order of decreasing statistical significance. AF = atrial fibrillation; TIA = transient ischemic attack.

mission was a significant predictor of the rhythm at discharge despite the fact that cardioversion, performed more frequently in cardiology, was included in the model.

In a logistic model that did not include cardioversion, the OR associated with an admission in an internal medicine ward increased to 1.68.

Discussion

To date, FIRE is the largest available registry on AF. Thus, it provides a unique opportunity to explore the current epidemiological features of patients with AF, to assess the overall burden of this arrhythmia on the health care system and, finally, to evaluate the diagnostic and therapeutic strategies followed in daily clinical practice.

Total burden of atrial fibrillation. The burden of AF on ER activities is high, since this arrhythmia accounted for 1.5% of all the medical interventions. On the basis of the population served by the 207 hospitals, the number of treated patients could be translated to a figure of approximately 2.7 medical interventions/1000 population per year. Moreover, AF represented 3.3% of all urgent medical admissions. Hospital admissions for this arrhythmia, including planned admissions to cardiology, account for approximately 2.2 hospital admissions/1000 population per year. Data from hospital discharges in Scotland[5] show a 3-fold increase in the number of hospitalizations for AF in the decade 1986-1996. In 1996, AF as a principal and secondary diagnosis accounted for 0.75 and 1.2%, respectively, of the total hospital activity.

Characteristics of the hospitalized patients. An equal number of males and females required hospitalization for AF. This, as well as the average age (70 years) is in agreement with the finding of the Scottish study[5]. The CARAF study enrolled 560 men and 339 women aged was 60 and 65 years respectively[10]. However, the study enrolled non-consecutive patients. In the present study, hypertension and diabetes were more frequent than in the CARAF study (59 vs 39% and 15 vs 9%, respectively).

Ten percent of patients were hospitalized because of atrial flutter, rather than AF, providing the first reliable figure of the relative incidence of the two arrhythmias as a cause of urgent medical advise. The data also provide an estimate of the proportion of patients with "lone" AF requiring medical care. In 31% of the hospitalized patients no cardiac disease was present, while in 18% no disease (either cardiac or non-cardiac) could be detected.

The most frequent symptom was palpitation present in almost 70% of the patients admitted to hospital, followed by dyspnea at rest or during effort, by fatigue and angina that were each associated with AF in approximately 10% of patients. Neurological symptoms such as stroke or TIA were each present in approximately 1% of patients.

The percentage of hospitalized patients exceeded 60% and was unexpectedly high, taking into account that almost 70% of the patients reached the ER within 48 hours of the onset of the arrhythmia. Indeed, the steering committee anticipated a hospitalization rate of about 30%. Equally unforeseen was the allocation of 20% of the patients in an intensive or semi-intensive care unit, although this generally represented the sole possibility of obtaining continuous ECG monitoring. Both findings highlight the difference between the approach suggested and practiced by arrhythmologists, as the members of the steering committee were, and what occurs in everyday practice throughout a whole country, often in smaller or rural hospitals. They also highlight the importance of registries, such as the present one that, at variance with most other groups of patients studied to date, enroll consecutive non-selected patients in every type of hospital.

Pharmacological approach. Cardiologists, compared with physicians in internal medicine, prescribed significantly less digoxin and significantly more amiodarone and propafenone. Overall, the use of antiarrhythmic drugs was relatively high and appears to be in agreement with the widespread practice in Europe favoring an attempt of pharmacological cardioversion in the great majority of patients candidate to rhythm restoration. Amiodarone and class IC drugs (propafenone much more than flecainide) were by far the preferred agents. Quinidine was used in 3.1% of the total number of patients, and ibutilide in 0.5% of the patients admitted to cardiology. In this setting, relatively few patients were prescribed rate-controlling drugs such as beta-blockers and calcium antagonists. Despite the high proportion of patients in whom rate control was not the first option, since a cardioversion was attempted, it appears that these figures represent an underuse of such pharmacological agents, and particularly of beta-blockers. This is likely to occur since many physicians still rely on digoxin for rate control, despite its incomplete effects in conditions of elevated sympathetic activity[11]. A prevalent use of digoxin for rate control was also shown among 139 patients with chronic AF enrolled in the CARAF registry[9]: 70% of them was taking digoxin and only 19 and 18% a beta-blocker and a calcium antagonist respectively.

Cardioversion. Cardioversion was attempted in almost 3 out of 4 patients admitted within 48 hours of the onset of AF, significantly less frequently thereafter. Every year of increasing age was associated with a 3% lower probability of undergoing cardioversion; heart failure and neurological symptoms at referral correlated with a lower likelihood of undergoing cardiover-

sion. Admittance to cardiology was associated with a significantly greater probability of an attempt of cardioversion, independently of the clinical characteristics of the patients. This is the first study that compares the therapeutic approach of specialists in cardiology with that of physicians working in other areas (notably internal medicine). The CARAF study recruited patients from many different sources, including general practitioners, family specialists, ERs and various hospital departments[7], but has not compared the therapeutic approach on the basis of the physician in charge, whereas the ALFA study[8] recruited patients through family cardiologists only. The present data demonstrate a more aggressive approach followed by cardiologists, probably due to the greater awareness of the morbidity associated with AF.

Difference in outcome according to the ward of admission. One of the major findings of the present study was the significant difference between cardiology and non-cardiology departments both in the approach and outcome of patients admitted for AF. Cardiologists tended to attempt cardioversion more frequently and relied less on the traditional approach of digoxin for rate control. The average duration of hospitalization was significantly longer in internal medicine. More importantly, admittance to a non-cardiology department was associated with a significant increase in the probability of being discharged without the restoration of sinus rhythm. To some extent, this less favorable outcome observed in medical departments is the direct consequence of the less aggressive approach toward an attempt of cardioversion. However, even taking into account the difference in the likelihood of undergoing cardioversion, admittance to cardiology was associated with a highly significant increase in the likelihood of being discharged in sinus rhythm. Despite the relatively small number of deaths and the inherent limitation of the assessment of in-hospital mortality for a disease such as AF, the finding of an OR > 2 for the overall mortality associated with non-cardiology admissions, is also of interest.

These findings suggest the appropriateness of organizing the in-hospital assistance of patients with an urgent access due to AF, taking into account the apparent greater efficiency and better outcome conferred by cardiologists, either by allowing easier access of patients to these departments or by establishing a closer cooperation between cardiologists and internal medicine departments as well as a wider diffusion of the potentially more appropriate and updated approaches to this disease.

Conclusions. The present study indicates that AF is a major cause of morbidity requiring urgent medical care and is associated with the use of very significant resources. The rate of hospitalization from the ER was found to be much higher than expected, highlighting the gap between the approach in selected centers and daily clinical practice. The registry also provides reliable epidemiological data based on several thousands of consecutive patients.

Moreover, the study found very marked differences in the medical approach between patients admitted to cardiology and those admitted to non-cardiology departments. Multivariate analysis revealed that patients in the latter group had a longer hospital stay, a lower probability of undergoing cardioversion, a lower probability of being discharged in sinus rhythm, and a greater in-hospital mortality.

Overall, the findings of this study may have significant implications on the development of the most appropriate strategies to employ to overcome the gap between the increased awareness of the potentially unfavorable effects of AF and the thorough application of an effective and comprehensive medical approach.

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Appendix

Structure of the FIRE study

Steering Committee
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Scientific and Organizing Secretariat and Data Management
A. Boggi, P. Fontanive, M. Gorini, D. Lucci, S. Barlera, L. Sarti

Participating Centers

- *Piemonte:* Acqui (P.L. Roncarolo, E. Boffa), Asti (F. Gaita, L. Vivalda), Borgomanero (M. Zanetta, F. Erbetta), Cuneo (E. Uslenghi, E. Racca), Cuorgnè (P.M. Saporito), Domodossola (G. Tirella, M. Modica), Moncalieri (G. Lavezzaro, R. Gayet), Pinerolo (E. Bellone, P. Carvalho), Torino Molinette (G. Trevi, Z. Buslenko), Torino Mauriziano (G. Baduini, A. Pizzuti)
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