Abstract. – BACKGROUND: The Cardioversion of Atrial Fibrillation in Emergency (CAFE) study was an observational, retrospective, multi-center study focusing on patients with recent onset atrial fibrillation (AF) seen in six different Emergency Departments (ED) of Rome, Italy.

AIM: The aim of this study was to present the baseline characteristics and risk factors of the patients enrolled to the CAFE study.

MATERIALS AND METHODS: We retrospectively reviewed 3085 eligible patients diagnosed with recent onset AF in any of the EDs between January 2008 and December 2009. Inclusion criteria required documented ICD-9 primary discharge/admission diagnosis of AF in the ED and stable hemodynamic conditions at presentation (systolic blood pressure > 90 mmHg). Exclusion criteria were permanent AF or an ongoing acute coronary syndrome.

RESULTS: Median age was 71 years (interquartile ranges, 62-78 years) and 50.8% were men. Palpitations was the most common symptom at ED presentation and was present in 73.5% of the study subjects. Hypertension was the most prevalent comorbidity, affecting 59.3% of the patients evaluated, and the presence of previous episode(s) of AF was also common (52.3%). Regarding home treatment, the drugs most prescribed were antiplatelets (31.2%) and diuretics (25.2%). A CHADS2 score of 0 was found in 814 patients (26.4%), while a CHADS2 score of 1 was reported in 1114 patients (36.1%). Finally, a CHADS2 score ≥ 2 was reported in 1157 patients (37.5%).

CONCLUSIONS: The present study represents an important snapshot of demographics, comorbidities, risk factors and anticoagulation management about patients with recent onset AF.

Disparities were noted in anticoagulation management, suggesting that this is still a main problem among patients with AF.

Key Words: Atrial fibrillation, Heart failure, Antiplatelet, Hypertension.

Introduction

Atrial fibrillation (AF) is the most commonly managed dysrhythmia in the Emergency Department (ED)\(^1,2\), affecting more than 2.3 million adults in 2001\(^3\) and accounting for 0.8% of all ED visits in the United States\(^4\). The prevalence of AF is 0.4% in general population and approximately 10% in those aged 80 years and over\(^5,6\). Its prevalence is expected to reach an increase up to 5.6 million individuals affected by 2050\(^7,8\). This makes AF a major public health problem\(^9\), also considering that during the past 20 years hospital admissions for AF increased by 66%, with total health care costs estimated between 6 and 26 billion dollars\(^9,10-16\).

AF increases long-term risk of stroke, heart failure and all-cause mortality, with an overall mortality rate for AF patients that is approximately double compared to patients in normal sinus rhythm\(^17-22\). Advanced age, essential hypertension, diabetes and cardiovascular disease are risk factors associated with developing AF\(^21,22,23,26\).

AF is usually diagnosed in patients presenting to the ED complaining of new onset of signs and symptoms.
symptoms, such as dyspnea, tachycardia, chest pain, palpitations, weakness or syncope, consistent with symptomatic AF. Recent onset AF is defined as a first-detected or recurrent episode of atrial fibrillation lasting less than 48 hours. Despite the recent publication of international guidelines, the ED management of recent onset AF remains controversial, due to the few existing data on AF in ED population and the variation in management among EDs.

The aim of this study is to present the baseline characteristics and risk factors of the patients enrolled to the CAFE study.

**Materials and Methods**

**Study Design**

The Cardioversion of Atrial Fibrillation in Emergency (CAFE) initiative was an observational, retrospective, multicenter trial focusing on patients with recent onset AF seen in six different EDs of Rome, Italy. The study has been approved by the Institutional Review Board of our University Hospital.

**Study Setting and Population**

Briefly, the CAFE initiative involved six hospitals located in Rome, Italy, specifically four academic centers and two community hospitals, and consisted of a retrospective data gathering on patients diagnosed with recent onset AF in any of the EDs from January 1st, 2008, to December 31st, 2009. Inclusion criteria required documented ICD-9 primary discharge/admission diagnosis of AF in the ED and stable hemodynamic conditions at presentation (systolic blood pressure >90 mmHg). Exclusion criteria were permanent AF or an ongoing acute coronary syndrome.

**Study Protocol**

An electronic spreadsheet (Microsoft Excel, 2007; Microsoft Corporation, Redmond, WA, USA) collected detailed patient data including demographics, symptoms at presentation, comorbidities, home treatment, ED treatment, cardioversion in the ED and the final ED disposition. Stroke risk was estimated for each visit based upon the widely accepted CHADS2 score. The CHADS2 risk score includes the following variables: heart failure (one point), hypertension (one point), age over 75 years (one point), diabetes (one point), history of stroke or transient ischemic attack (two points). Therefore, the score produces results from 0 (low risk) to 6 (high risk).

Two investigators (PI and DM) reviewed all patients’ electronic medical record following strict chart review, previous published guidelines. They identified eligible patients from the original study database.

**Statistical Analysis**

Baseline clinical characteristics of patients enrolled in the CAFE initiative is described only for eligible patients. Continuous variables were summarized using medians and interquartile ranges; categorical variables were summarized using frequencies and percents. CHADS2 risk score was calculated for each patient at each ED visit, and was reported as frequencies and percents. Missing values for risk factors were assigned a value of 0. Patient characteristics were compared using the Pearson Chi-square test for categorical variables. All statistical analyses were carried out using SPSS version 16.0 (SPSS Inc., Chicago, IL, USA).

**Results**

Between January 2008 and December 2009, 3217 were enrolled in the original cohort. For the purpose of this study, the final analysis was performed on 3085 eligible patients with recent onset AF.

**Baseline characteristics.** Table I presents the baseline characteristics for the 3085 patients included in the final analysis. In this study, median age was 71 years (interquartile ranges, 62-78 years) and fifty point eight percent were men. Palpitations was the most common symptom at ED presentation and was present in 73.5% of the study subjects, followed by dyspnea (18.8%) and chest pain (16.5%), while syncope was the least common on presentation (4.4%). Hypertension was the most prevalent comorbidity, affecting 59.3% of the patients evaluated, but the presence of previous episode(s) of AF was also common (52.3%). Regarding home treatment, the drugs most used were antiplatelets (31.2%), diuretics (25.2%), angiotensin receptor blockers (ARBs, 24.8%), Beta-blockers (23.2%) and angiotensin converting enzyme-inhibitors (ACE inhibitors, 21.5%). Antiarrhythmics were among the drugs least used by patients arriving to the ED with recent onset AF.

**Risk factors for stroke.** Stroke risk among the study population was estimated according to CHADS2 score. Table II shows the frequency of
Table I. Baseline characteristics of the patients included in the study.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Total (n = 3085)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age</td>
<td>71 (62-78)</td>
</tr>
<tr>
<td>Male gender</td>
<td>1568 (50.8%)</td>
</tr>
</tbody>
</table>

Table II. Descriptive frequencies for CHADS2 score on Emergency Department visits.

<table>
<thead>
<tr>
<th>CHADS2 score category</th>
<th>Total (n = 3085)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>814 (26.4%)</td>
</tr>
<tr>
<td>1</td>
<td>1114 (36.1%)</td>
</tr>
<tr>
<td>2</td>
<td>828 (26.8%)</td>
</tr>
<tr>
<td>3</td>
<td>219 (7.1%)</td>
</tr>
<tr>
<td>4</td>
<td>84 (2.7%)</td>
</tr>
<tr>
<td>5</td>
<td>24 (0.8%)</td>
</tr>
<tr>
<td>6</td>
<td>2 (0.1%)</td>
</tr>
</tbody>
</table>

The CHADS2 score points present at ED visits before diagnosis. A CHADS2 score of 0 was found in 814 patients (26.4%), while a CHADS2 score of 1 was reported in 1114 patients (36.1%). Finally, a CHADS2 score ≥ 2 was reported in 1157 patients (37.5%). Table III presents CHADS2 score of patients who were assuming or not antiplatelet therapy at time of ED visit. Antiplatelet agents were prescribed in 156 patients (5.1%) with CHADS2 score of 0, in 346 patients (11.2%) with CHADS2 score of 1, and in 449 patients (14.9%) with CHADS2 score ≥ 2. On the contrary, antiplatelet agents were not prescribed in 658 patients (21.3%) with CHADS2 score of 0, in 768 patients (24.9%) with CHADS2 score of 1, and in 698 patients (22.7%) with CHADS2 score ≥ 2.

Table IV shows CHADS2 score of patients in treatment or not with oral anticoagulation therapy at time of ED visit. Vitamin K antagonists were prescribed in 90 patients (2.9%) with CHADS2 score of 0, in 168 patients (5.4%) with CHADS2 score of 1, and in 217 patients (7.1%) with CHADS2 score ≥ 2. Table IV shows CHADS2 score of patients in treatment or not with oral anticoagulation therapy at time of ED visit. Vitamin K antagonists were prescribed in 90 patients (2.9%) with CHADS2 score of 0, in 168 patients (5.4%) with CHADS2 score of 1, and in 217 patients (7.1%) with CHADS2 score ≥ 2. The differences among the different groups and subgroups were all statistically significant (p < 0.0001).

Discussion

The baseline clinical characteristics of patients participating in the CAFE study provide an unique view of patients with recent onset AF diagnosed in a large city as Rome. Although it was not the purpose of our analysis, the results suggest that our study subjects do not differ from the global population for clinical characteristics as age, presence of comorbidities and cardiovascular risk factors.

In this study, the majority of patients had at least one cardiovascular risk factor. The most prevalent accompanying comorbidity in patients with recent onset AF was hypertension (59.3% of total patients), but the presence of previous episode(s) of AF was also common (52.3% of total patients). The most common symptom on ED presentation was palpitations, complained by 73.5% patients, a result in line with previous studies.

ACE: Angiotensin converting enzyme; ARB: Angiotensin receptor blocker; COPD: Chronic obstructive pulmonary disease; TIA: Transient ischemic attack. *Signs of acute heart failure: dyspnea at rest, or peripheral pitting edema, or rales on auscultation, or signs of pulmonary edema on chest X-ray study.
Stroke prevention is one of the main treatment goals in patients with AF. In this study, we used as risk stratification index to predict stroke the guidelines-recommended CHADS2 score, which is initial, rapid and easy-to-remember28. According to this score, patients with a CHADS2 score of 0 are classified as at low risk of stroke, and either aspirin, or no antiplatelet therapy may be used. Patients with a CHADS2 score of 1 are classified as at intermediate risk of stroke, and either aspirin or a vitamin K antagonist may be used; patients with a CHADS2 score ≥ 2 are classified as at high risk of stroke, and a vitamin K antagonist is preferred. Among our study population, 814 patients (26.4%) were included in the low risk category (CHADS2 = 0), 1114 patients (36.1%) were included in the intermediate risk category (CHADS2 = 1), and 1157 (37.5%) were classified as at high risk of stroke (CHADS2 ≥ 2).

Management of anticoagulation in patients with AF is a main problem worldwide, and in this sense our findings are very similar to those of earlier studies36,37. In our cohort, only 217 patients (7.1%) classified as at high risk of stroke (CHADS2 ≥ 2) were taking a vitamin K antagonist, whereas 698 patients (22.7%) included in the same category were not taking any vitamin K antagonist. Furthermore, 90 patients (2.9%) classified as at low risk of stroke (CHADS2 = 0) were taking a vitamin K antagonist at the time of ED visit. Another treatment pattern that differed from the guidelines’ recommended treatment was found in 449 patients (14.9%) classified as at high risk, who were prescribed with antiplatelet therapy.

This study has several limitations. Firstly, important variables not recorded by the ED physicians might have missed; for instance, vascular disease was not systematically recorded, and, thus, was impossible to calculate the CHA2DS2-V ASc score for each patient. CHA2DS2-V ASc score (28) is a more comprehensive risk factor-based approach to calculate stroke risk in patients with AF and, therefore, is especially indicated in low and intermediate risk categories. Secondly, our cohort consisted only of ED patients with recent onset AF diagnosis. This inclusion criteria introduces a significant selection bias, not reflecting the total population of patients with AF, such as those with permanent AF. Third, we did not have data on the risk of bleeding. Therefore, we could not draw any definite conclusion about

<table>
<thead>
<tr>
<th>CHADS2 score</th>
<th>No antiplatelets (n = 2124)</th>
<th>Antiplatelets (n = 961)</th>
<th>Total (n = 3085)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>658 (21.3%)</td>
<td>156 (5.1%)</td>
<td>814 (26.4%)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>1</td>
<td>768 (24.9%)</td>
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<td>&lt; 0.0001</td>
</tr>
<tr>
<td>2</td>
<td>496 (16.1%)</td>
<td>322 (10.8%)</td>
<td>828 (26.8%)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>3</td>
<td>135 (4.4%)</td>
<td>84 (2.7%)</td>
<td>219 (7.1%)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>4</td>
<td>46 (1.5%)</td>
<td>38 (1.2%)</td>
<td>84 (2.7%)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>5</td>
<td>19 (0.6%)</td>
<td>5 (0.2%)</td>
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<td>&lt; 0.0001</td>
</tr>
<tr>
<td>6</td>
<td>2 (0.1%)</td>
<td>0 (0.0%)</td>
<td>2 (0.1%)</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>

p value for the difference between no antiplatelets and antiplatelets groups; Pearson Chi-square test.
Conclusions

The present analysis of the baseline clinical characteristics of patients included in the CAFE study represents an important snapshot of demographics, comorbidities, risk factors and anticoagulation management. In this study, palpitations was the most common symptom at ED presentation in patients with recent onset AF, whereas hypertension was the most prevalent comorbidity present in this population. Furthermore, the majority of patients had at least one cardiovascular risk factor and, consequently, a CHADS2 score of at least 1. Disparities were noted in anticoagulation management, suggesting that this is still a main problem among patients with AF.

References


Baseline characteristics and risk factors among ED patients presenting with recent onset AF


