

# A Chronic Disorder in the Emergency Room: A Descriptive Analysis of Paroxysmal Atrial Fibrillation Cases Requiring Urgent Treatment

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**Abstract** Atrial fibrillation (AF) is the most frequent arrhythmia, and patients frequently visit emergency departments, where the condition might be diagnosed for the first time. An analysis of factors that might lead a chronic patient to seek urgent medical treatment is important, especially in terms of preventing long-term disability and morbidity. This is even truer for atrial fibrillations, whose complications have a known notoriety and are source of important mortality figures, mainly related to ischemic stroke or more serious consequential cardiac arrhythmias. We have studied paroxysmal AF cases treated during a period of two months in an emergency facility of the University Hospital Centre of Tirana, with 106 patients recruited sequentially in a prospective, open-label and descriptive study. Our data confirmed an important association between overweight and obesity and paroxysmal AF in general, since more than 80% of the patients suffering from this condition had a high body mass index. A thorough discussion of the data, confronted with much larger studies reported from several sources and available actually, is made at the end of the paper. The necessity to re-confirm findings through larger groups of study and through a multi-centre design is formulated.

**Keywords:** atrial fibrillation, emergency room, non-valvular atrial fibrillation, risk factors, body-mass index

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## 1. Introduction

Atrial fibrillation (AF) represents an atrial tachyarrhythmia characterized from a loss in the electrical coordination of atrial activity, leading to a subsequent damage of the mechanical properties of the left atrium, as well as to a disturbed ventricular rhythm. There are no universally accepted data related to the prevalence of AF in the general population, but opinions accept that prevalence is rising [1]. The interest on the left atrium has become increasing not only because the high prevalence of AF and other disorders that might affect this structure; in fact experts' opinion recognize that left atrium is indispensable to the normal circulatory performance, and not merely a subordinate structure of the left ventricle [2].

Emergency room (ER) is the place where AF might be diagnosed for the first time, and best practices to define the ways of treatment and patients' disposition are suggested [3]. Attempts to profile the demographics of the AF patients visiting emergency facilities and respective care they're offered, together with changes of these factors during periods of time have been made as well [4].

There is however a converging opinion, with regard to an increasingly use of ER from AF patients; panoply of

factors might have caused this increase in the number of patients requesting emergency interventions, among which the aging of the population seems to be the most important [5]. Clinical symptomatology will of course be the main factor pushing the patient toward ER care, and this is true even more for the first episode of AF, which might be therefore diagnosed initially in emergent conditions, and treated in this setting [6].

The evaluation of treatment strategies, the scheduling of follow-up and hospitalization policies seem all of them highly important, when it comes to a situation with a mortality as high as 10% within a year from the last (be it the first) visit in ER [7]. Co-morbidities have been imputed as a very important factor, and gender differences have been scrutinized in large-scale studies such as SAFETY [8]. With regard to the potentiality of further complications, stroke has been ever since the most notorious event, with intensive discussions on the opportunity of anticoagulation versus the treatment with antiagregants alone; the recent broadening of the pharmacological class of anticoagulants raised justified hopes, mainly toward the avoidance of iatrogenic effects related to the use of warfarin [9]. However, when it comes to practical measures, mostly used in emergency facilities, aiming at controlling the heart rhythm and rate all over the day, digitalis and beta-blockers have gained the

overwhelming role during the era of the modern pharmacology [10].

The main objective of our study was the analysis of factors that might lead a chronic patient, suffering from AF, to request urgent medical treatment in ER facilities. The identification of these factors and the characterization of the relative importance of each of them would help shaping future medical and pharmacological strategies in terms of preventing long-term morbidity, disability and lethality.

## 2. Methodology

The ER of 'Mother Theresa' Hospital represents the only tertiary (university) internal medicine and cardiology facility in Tirana, Albania. In the present study we recruited all patients presented there and requiring temporary medical treatment in the observation rooms from June 25<sup>th</sup>, 2012 to August 31<sup>st</sup>, 2012. During that period 11046 patients visited the ER facility of 'Mother Theresa', and 2859 represented clear cardiologic emergent cases. From this total of cardiologic emergencies, 483 cases were suffering AF as a primary diagnosis, separated in four groups as following:

1. Paroxysmal AF: 106 cases;
2. Chronic AF: 284 cases;
3. Permanent AF: 93 cases.

The study design was prospective, open-label, following the recruitment without exclusion of all patients who were requiring medical help in an occasional sequence in the over-mentioned ER facility. A detailed history of the disorder was registered. The study covered a precise period of time of approximately two months. A descriptive analysis of all obtained data was performed.

Following data were noted and the respective tables were compiled:

- a. Age;
- b. Gender;
- c. Body-mass index;
- d. Concomitant and accompanying diseases;
- e. Transthoracic echocardiographic parameters of left atrium and ventricle, according to previously tested protocols [11];
- f. Thyroid function and thyroid hormones profile;
- g. Risk factors (hypertension, familiar history, smoking, alcohol, caffeine abuse).

The selection of data and parameters to enter the descriptive analysis was based on the suggestions of the literature and other authors' findings, as well as on hypothetical or theoretical opinions, that correlate one or several of over-mentioned parameters or diagnoses with AF in general, with its clinical course and eventually with a need for emergent treatment.

## 3. Results

The average **age** of patients with paroxysmal AF requesting emergent medical treatment was  $67.3 \pm 6.7$  years. Patients were divided in three subgroups according to the following [Table 1](#).

From the total number of patients with paroxysmal AF we had 51 females (48.1%) and 55 males (51.9%), thus

the study did not detected any significant **gender** difference.

**Table 1. Age of paroxysmal AF patients recruited in the present study**

Subgroup	Age (years)	Number of patients	Percentage
1	< 65 years	55	51.88
2	65-85 years	49	46.22
3	> 85 years	2	1.88

Body-mass index (**BMI**) was computed, aiming at the dividing of patients with normal BMI from those with overweight and obesity. The results are summarized at the [Table 2](#).

**Table 2. BMI of the patients in the study group**

BMI value	Number of patients	Percentage
< 18.5 (underweight)	1	0.9
18.5 – 24.9 (normal weight)	22	20.8
25 – 29.9 (overweight)	46	43.4
≥ 30 (obese patients)	37	34.9

With regard to the concomitance or the presence of **other diseases** in the study group, we concluded that 34.9% of the cases had no accompanying disease. A very important part of the accompanying diseases was the presence of valvulopathies, since 58% (61 patients) of all 106 recruited cases with paroxysmal AF had a patent valvulopathy. The predominant valvulopathy was the aortal stenosis (47 patients), followed from mitral stenosis (11 patients) and a minority of cases with mitral or aortal stenosis (respectively 2 and 1 cases). Other present diagnosis and respective percentage of patients suffering from those are summarized at the [Table 3](#).

**Table 3. Accompanying diagnosis at the study group**

Diabetes mellitus	20 patients (18.8%)
Ischemic cardiopathy	14 patients (13.2%)
Hyperthyreosis	10 patients (9.4%)
Myocardial infarction	8 patients (7.5%)
Pulmonary disease (COPD, malignancy)	8 patients (7.5%)
Acute gastroenteritis	5 patients (4.7%)
Cardiac failure	3 patients (2.8%)
Positive history for ischemic stroke	3 patients (2.8%)
Post cardiac surgery	2 patients (1.9%)

A very important step toward profiling the study group is the study of **echocardiographic parameters**. Obviously, dividing the AF in a non-valvular and a valvular one has serious implications on the issue; thus a very accurate evaluation of the valvular apparatus is needed in all cases. Such an evaluation is mainly based of sonography parameters, and a transthoracic echography was performed to all patients recruited herein.

However, the difference we found in between the total number of cases with a dilated left atrium (diameter > 40 mm) and with a normal left atrium was not significant. We had a total of 57 patients with a dilated left atrium (53.8%) and another 49 of them with a normal diameter (46.2%). Left ventricle was evaluated as well, with 73% of cases presenting normal echocardiographic parameters (77

patients), with 27% of cases having a left ventricle hypertrophy or a dilation of the structure (29 patients).

**Thyroid function** is another important diagnostic step in finding out factors that might cause a sudden aggravation of the AF clinical picture. In spite that from the total of 106 patients with paroxysmal AF only 10 patients (9.4%) suffered from hyperthyreosis, very important was the fact that during the diagnostic workup in ER we uncovered three new cases with hyperthyreosis, never diagnosed before. This is of a primary importance, since hyperthyreosis per se is considered as a controllable etiological factor of AF.

The presence of cardiovascular **risk factors** was registered as well, with 83% of patients presenting more than one risk factor (hypertension, smoking, alcohol and/or caffeine abuse), and the rest of patients (17%) showing only one major cardiovascular risk factor.

## 4. Discussion

A chronic disorder per definition, such as AF, might become a competence of the emergency specialist for different reasons. Concomitant events, electrolytic disorders, and even psychosocial stress might influence consistently over the disorder and over the heart rhythm in general. Important occurrences leading a patient to the ER are obviously ischemic and stroke-like events that unfortunately do occur even when patients are under anti-thrombotic therapy. Avoidance of such serious complications has led several sources to advise a more aggressive therapeutic approach, thus advocating the use of oral anticoagulants, which seem superior toward preventing ischemic events [12].

In our study group we have found a very similar pattern of AF presentation between patients aged 65 years and the older group, thus an age-dependent pattern of disease cannot be formulated. In fact, age-dependent arrhythmias have been diagnosed elsewhere and their respective genetic characteristics have been uncovered; even some genetic variants found in the general population and related to AF have been reported [13,14]. Always aiming to a population profile of AF, ethnic differences have been scrutinized, with differences found, but with results still controversial [15].

With regard to the gender, we found as well a very similar pattern of distribution in between male and female patients, with both subgroups close to 50%; lack of gender difference in AF outcome and treatment has been found in other much larger studies as well [16]. Other series, however, have found a higher incidence of morbidity and mortality of AF complications in women [17].

BMI seems to be a very important factor in terms of AF exacerbation and of its clinical picture worsening as well; approximately 80% of the entire study group was represented from overweight and obese patients. Different sources have emphasized the ominous role that a high BMI index might have toward AF recurrence and AF-related complications (stroke, thromboembolism) in general [18,19,20]. Like in many other cases, dissenting conclusions have been paradoxically formulated even with regard to this issue, with some authors suggesting that obese AF patients might even have better long-term outcomes when compared to the non-obese group; a result which attends an alternative confirmation [21].

The role of accompanying diseases and other risk factors seems to be important as well, since the majority of patients showed the presence of more than one major cardiovascular risk factor. Although formulating interrelated and intrinsic dependences between risk factors is a difficult task, mainly due to overlapping influences, anyway hypertension, diabetes and impaired glucose tolerance have already been accused as factors associated with AF and its severity [22,23]. Aortal atherosclerosis has been as well found in association with AF [24].

The echocardiographic parameters and the diameter of left atrium have obviously an important meaning for the AF presence and severity, and authors converge on the impact of left atrium dilatation [25,26]. The same seems true, even for the thyroid function and the role of hyperthyreosis over the appearance and persistence of AF [27].

## 5. Conclusions

In the present study we found an important association between the high BMI and AF as a medical condition requiring an emergency treatment. Other factors under scrutiny suggested only a subliminal influence over the presence, severity and recurrence of this condition. Of course, the limited number of patients (106 in total), the single centre where the study took place, and the short time length of the patients' recruitment (two months), which are otherwise intrinsically related to each-other as study parameters, cannot allow the achievement of irrefutable conclusions or of any significant statistical differences.

Performing the study inside a single facility however offers several advantages, especially regarding the standardization of diagnostic procedures, and the direct observation or monitoring of therapeutic measures adapted, with their respective beneficial effects. However, there is an obvious necessity to carry out much larger studies, in terms of the number of recruited patients, as well as to confirm the findings through a multi-centre design.

## Conflict of Interest

none

## Supporting Source

none

## Abbreviations

AF – atrial fibrillation;  
 BMI – body-mass index;  
 ER – emergency room;  
 UHC – University Hospital Centre;  
 COPD – chronic obstructive pulmonary disease.

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