

Atrial Fibrillation Management in Emergency Departments: A New Protocol Assessment



Matthieu Marchetti^{1*}, Sandrine Charpentier^{2,4}, Alexandre Duparc³, Didier Carrie^{3,4} and Dominique Lauque^{2,4}

¹Department of Emergency Medicine, University Hospital Center of Poitiers, France

²Department of Emergency Medicine, University Hospital Center of Toulouse, France

³Department of Cardiology, University Hospital Center of Toulouse, Toulouse, France

⁴University of Toulouse III, France

Submission: March 03, 2018; **Published:** March 14, 2018

*Corresponding author: Matthieu Marchetti, Department of Emergency Medicine, University Hospital Center of Poitiers, 2 Rue de la Milétrie, 86000 Poitiers, France, Tel: +33-5-49-44-33-10/+33-6-88-46-03-81; Email: matthieu.marchetti@gmail.com

Abstract

Objective: Recommendations for atrial fibrillation (AF) management do not always consider the specificities of the practice of emergency medicine. The choice of sinus rhythm or heart rate control is often debated. We aimed to prospectively evaluate a protocol of treatment for newly discovered or poorly controlled AF management in emergency department (ED).

Method: Monocentric, prospective, non-interventional study, of which the objective was to evaluate performances of a therapeutic protocol for first diagnosed AF, during a period of four months. Primary endpoint was to obtain sinus rhythm or heart rate below 100bpm, without symptoms, within four hours of care.

Result: Fifty-eight patients were included in the study and treated according to the protocol. Primary endpoint was achieved in 74% of patients, after four hours of care ($p \leq 0.05$). No patient had poorly tolerated AF after care. The protocol was effective in 96% of the least seriously ill patients ($p < 0.001$) and in 87% of patients with under-lying heart disease ($p \leq 0.05$). It was correlated with a return home in 91% of cases ($p \leq 0.05$).

Conclusion: Protocol showed good results for 74% of patients following four hours of care.

Keywords: Atrial fibrillation; Emergency; Protocol evaluation; Rhythm control; Frequency control

Introduction

Non-valvular atrial fibrillation (AF) is the most frequently encountered heart rhythm disorder in emergency medicine. It is at the origin of one third of hospitalizations for arrhythmia [1, 2]. Its prevalence is about 1.5 to 2% of the general population and increases quickly with age, reaching over 10% in 80-year-old subjects and over 20% after 90 years of age [3]. Death rates are doubled by AF, due to an increased risk of thromboembolic [4-7] and hemodynamic complications [1-3] and an increased risk of hospitalization [1]. Because emergency physicians are often the first to manage these patients, we easily understand the challenge of optimal management of early discovered atrial fibrillation in emergency departments (ED).

Recommendations for AF management were issued by the European Society of Cardiology (ESC) in 2010 [1], with an update in 2012 [2]. AF diagnosis is based on electrocardiogram (ECG), but treatments depend largely on clinical context and co-

morbidity conditions. ESC recommendations also emphasize thromboembolic risk stratification, which is the most frequent complication [8], using the CHADs -VASc score [2], and underline the importance of rhythm control strategy (anti-arrhythmic drugs) and/or heart rate control (beta-blockers). Strict application of the recommendations is difficult for emergency physicians to apply. Some drugs are not suitable in ED because of their dosages and the need for prolonged surveillance and in addition, emergency physicians are called upon to decide between rhythm or heart rate control strategy. This lack of clarity may present a handicap in ED. An algorithm for management of newly discovered or poorly controlled AF in the ED has been developed in collaboration with cardiologists, at our University Hospital. While respecting ESC guidelines [1,2], the algorithm implements heart rate control strategy, supervises anti-thrombotic therapy as well as application of specialized re-views and proposes a discharge strategy. We aimed to prospectively evaluate this protocol.

Methods

Study design

We conducted a prospective, non-interventional, single-center study, from April 1, to August 31 2013, in the ED of our University Hospital, which receives 35,000 patients per year. It was an observational study. All procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

Patient selection

Patients with AF newly discovered in the ED, or those with AF previously diagnosed but with inappropriate ventricular rate (>110bpm) causing symptoms or hemodynamic distress in ED, were eligible for inclusion by the managing emergency physician. Exclusion criteria included the following: age younger than 18

years, AF manifested initially as an ischemic stroke or transient ischemic attack, previously diagnosed and treated AF without symptoms in ED, other supra-ventricular rhythm disorders other than AF. Clinical history (persistence of symptoms, previous cardiovascular disease, risk factors of AF, medication reported by the patients), physical evaluation, 12-lead ECG, standard blood tests, chest radiography and stroke risk estimation were performed on all included patients. All data were collected prospectively and directly reported in a case report form by the treating physician.

Outcome measure

The primary outcome was the proportion of patients with a sinus rhythm or heart rate below 100 bpm without persistent symptoms (chest pain, dizziness, dyspnea, fatigue, palpitations) at discharge from ED.

Study protocol

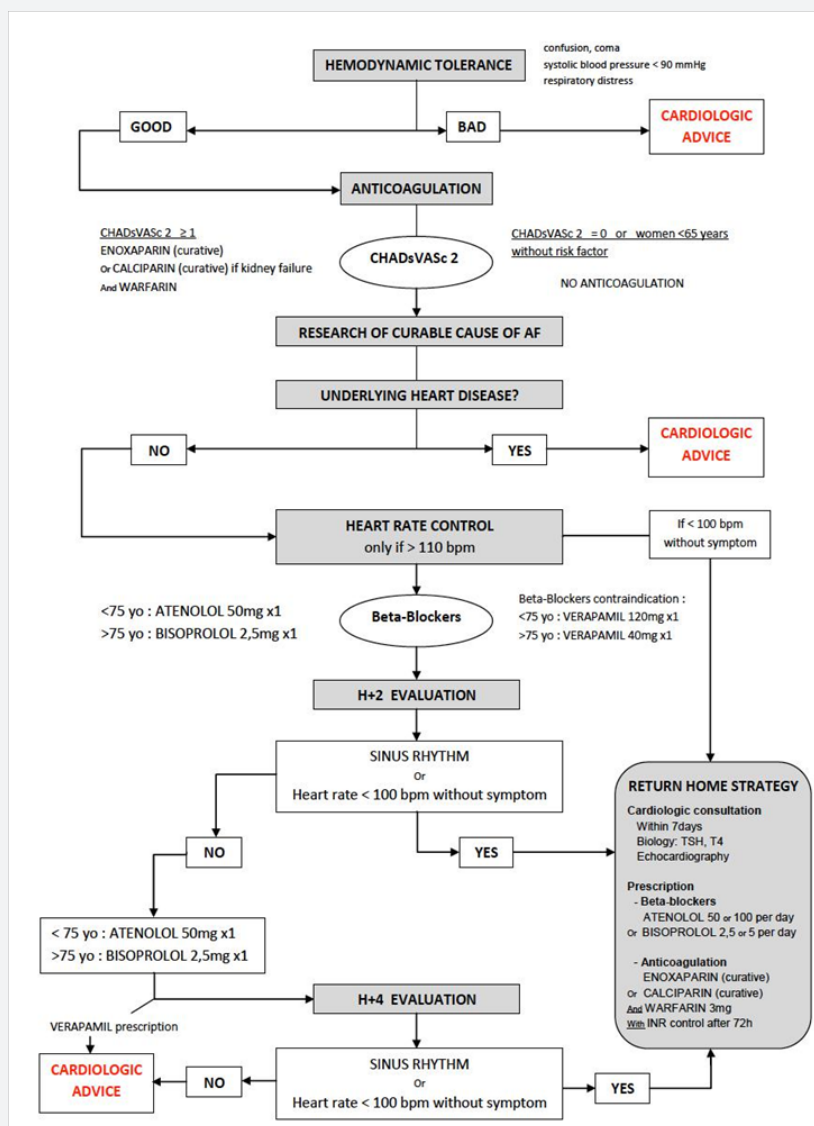


Figure 1: Protocol.

Emergency physicians and cardiologists set up a protocol for initial management of acute AF in ED (Figure 1), that was based on the guidelines for the management of AF published in 2010 and updated in 2012 [1,2]. The algorithm required stroke risk estimation, search for AF complications and conditions that predispose to AF. Control of the ventricular rate, anti-thrombotic therapy, cardiologist consultation and ED discharge were decided according to the algorithm. The protocol was approved by the rhythmologists of our institution.

Data analysis

Data were recorded using Excel® software (Microsoft Corporation, Richmond, USA). Statistical analyses were performed using STATA11 software (StataCorp LP, College Station, TX). Comparative analyses were performed using the x²-test and Fisher’s test for percentage comparisons. Student test and Mann-Whitney test were performed for comparisons of averages and medians. A p value less than 0.05 was considered statistically significant for all tests.

Results

Demographic data (Table 1)

During the study period, 58 patients fulfilled the inclusion criteria and were treated in accordance with the proto-col. Mean age was 76 years. AF was the main reason for admission to ED for 26 (45%) of them. Fifty-two per cent (n=30) were women. AF was first diagnosed in ED in 39 (67%) patients. Most patients were hemodynamically stable (n=54, 93%).

Results on primary outcome (Table 2)

Table 2: Results on primary outcome.

	Patients successfully Treated (n=43)	Patients not successfully Treated (n=15)	Total (n=58)	p
Age - years	75.7	77.8	76.2	
Rhythm at ED discharge				
Sinus rhythm - n (%)	9 (15.5)	NA	9(15.5)	≤0.05
Arrhythmic with <100 bpm - n (%)	34(58.6)	NA	34(58.6)	
Arrhythmic with >100 bpm - n (%)	NA	15(25.9)	15(25.9)	
Poor hemodynamic tolerance - n(%)	NA	0 (0)	0 (0)	
Cardiologic Advice				
Yes - n (%)	17(-54.8)	14(45.2)	31(53.4)	<0.001
No - n (%)	26(96.3)	1(3.7)	27(46.6)	
Known Heart Disease				
Yes - n (%)	20(-86.9)	3 (13.1)	23(39.7)	≤0.05
No - n (%)	21(-72.4)	8 (27.6)	29 (50)	
NR - n (%)	2 (33.3)	4 (66.7)	6 (10.3)	
Outcome				
Return home - n (%)	20(-90.9)	2(9.1)	22(37.9)	≤0.05
Hospitalization - n (%)	23(-63.9)	13(36.1)	36 (62.1)	

Table 1: Demographic data.

	Patients Treated in accordance with the Protocol (n=58)
Age - years	76.2
Sex	
Male - n (%)	28(-48.3)
Female - n (%)	30(-51.7)
Primary Reason of Admission	
AF - n (%)	26(-44.8)
Other - n (%)	32(-55.2)
Past History of AF	
Yes - n (%)	19(-32.7)
No - n (%)	39(-67.3)
Hemodynamic Stability at ED Admission	
Yes - n (%)	54(-93.1)
No - n (%)	4(-6.9)

All in all, 74% of the patients (n=43) were successfully treated: 9 patients (15%) had recovered sinus rhythm and 34 patients (59%) remained arrhythmic but with a heart rate lower than 100bpm and no persisting symptom on discharge from the ED ($p \leq 0.05$). Among the 26% of the patients (n=15) whose heart rate was higher than 100bpm at the end of treatment, none presented with poorly tolerated AF (hemodynamic or respiratory disorders). Analysis of the sub-groups showed good results for 96% (n=26) of the least seriously ill patients ($p < 0.001$) for whom no cardiologic advice was necessary, and for 87% of the patients (n=20) with past history of heart disease ($p \leq 0.05$). Whatever the result of treatment, hospitalization was the outcome for the majority of patients (62%; n=36), because AF was not necessarily the primary reason for admission in ED. All in all, treatment according to the protocol was a success for the majority of patients (91%; n=20) who returned home as well as the majority (64%; n=23) who were hospitalized ($p \leq 0.05$).

Discussion

We wished to validate a protocol adapted to ED to treat AF discovered at admission or poorly controlled. We showed that the use of the protocol was correlated to a treatment success rate of 74%. After four hours of hospitalization in an emergency department: 15% of the patients had recovered sinus rhythm and 59% showed a heart rate lower than 100bpm, without residual symptoms.

Characteristics of the population

The characteristics of the patients included were similar to those found in most of the studies of patients with AF in emergency departments [9-11]. In our study, sinus rhythm restoration came to 15%, a rate nonetheless lower than that found in patients treated with antiarrhythmics [12]. Achievement of a heart rate inferior to 110 bpm is considered in the literature as a reasonable objective. It is associated with a diminution in morbidity and in rate of hospitalization [13,14].

Therapeutic strategy

The protocol was designed to cover thromboembolic risk as well as risk of heart failure symptoms. Organization of requests for cardiologic advice facilitates selection of patients at risk, whose condition could necessitate specialized treatment. Patients with contraindications to the proposed treatment or whose condition necessitated the introduction of anti-arrhythmic treatment were likewise offered systematic cardiologic advice. The therapeutic measures recommended in our protocol were in agreement with the 2010 and 2012 recommendations of the l'ESC [1,2] and with the data of the literature.

Rate control

We opted for a strategy designed to control the heart rate with beta blockers; this strategy is recommended for aged patients with few symptoms (class 1A recommendation, ESC). In an emergency department it is difficult to precisely date AF onset and initiation of anti-arrhythmic treatment is consequently by no

means devoid of risks. Moreover, no study has conclusively shown a difference in terms of mortality between strategies based on control of rate as opposed to those based on control of rhythm [15-19]. Nevertheless, anti-arrhythmic treatment could be applied in the event of poor hemodynamic tolerance (class 1B) or in patients having remained symptomatic following treatment in an emergency department (class 1B). A study by Atzema et al. [20] showed heightened risk of adverse effects and rehospitalization in the event of poor management of the beta blocker treatment. For Vinson et al. [21] introduction of a pharmacological treatment led in the majority of cases to sinus rhythm restoration. These data highlight the importance of satisfactory heart rate management in emergency departments.

Anticoagulation

Another study conducted by Atzema et al. [11] reported a constant increase over the last 10 years of the number of patients admitted to emergency departments with a CHA2DS2-VASc score greater than or equal to 2. According to Scheuermeyer et al. [22] half of the patients admitted to emergency for an AF problem left their wards without suitable anticoagulants. Our protocol, on the contrary, allowed for optimized anticoagulant treatment of patients admitted on account of AF. All of the patients treated were attributed a preliminarily calculated CHA2DS2-VASc score, in accordance with ESC recommendations. In fact, anticoagulant treatment is the treatment of choice for patients with a score greater than or equal to 2 (class 1A). As concerns patients with a score of 1, we opted for an anticoagulant (class 1A) rather than an antiplatelet treatment (class 1B). On the other hand, when treating women of less than 65 years of age and without any risk factor other than sex, we opted against use of anticoagulants (class 1B). In our protocol, we refrain from reference to the new anticoagulants (NOACs) for three reasons: their use is not associated with a higher level of evidence than classical anticoagulants (class 1A); they are recommended in the event of difficulties in use or adverse effects of the VKA drugs and INR instability (class 1B); they are reserved for non-valvular atrial fibrillations subsequent to cardiologic evaluation.

Limits of the study

Our study had biases, the first of which involved patient recruitment. Indeed, the protocol was not applied with regard to all the patients admitted to emergency with AF. Our study also showed a lack of power, which was due to the low number of patients having taken advantage of the protocol during the data collection period.

Conclusion

A protocol for treatment of recently discovered atrial fibrillation, based on the 2010 and 2012 recommendations of the ESC and taking into account the constraints related to the exercise of emergency medicine, brought about satisfactory results for 74% of the patients involved, over a time lapse not exceeding 4 hours. This protocol facilitates organization of requests for cardiologic

advice; at the same time, it provides a patient with optimal initial therapeutic management over a reasonable lapse of time.

References

1. Camm AJ, Paulus Kirchhof, Gregory YH Lip, Ulrich Schotten, Irene Savelieva et al. (2010) ESC 2010 Guidelines for the management of atrial fibrillation. *Eur Heart J* 31(19): 2369-2429.
2. Camm AJ, Lip GY, De Caterina R (2012) ESC 2012 focused update of the ESC Guidelines for the management of atrial fibrillation. *Eur Heart J* 21: 2719-2747.
3. Fuster V, Rydén LE, Cannom DS, Crijns HJ, Anne Bet et al. (2006) ACC/AHA/ESC Guidelines for the management of patients with atrial fibrillation. *J Am Coll Cardiol* 114(7): 1979-2030.
4. (1994) Risk factors for stroke and efficacy of thrombotic therapy in atrial fibrillation: analysis of pooled data. *Arch Intern Med* 154: 1449-1457.
5. Massoure PL, Sacher F, Derval N, Hocini M, Jais P, Haissaguerre M, et al. (2009) Atrial fibrillation in elderly patients. *Rev Prat* 59(10): 1365-1369.
6. Gage BF, Waterman AD, Shannon W, Boehler M, Rich MW, et al. (2001) Validation of clinical classification schemes for predicting stroke: results from the National Registry of Atrial Fibrillation. *JAMA* 285(22): 2864-2870.
7. Stroke prevention in atrial fibrillation investigators (1995) Risk factors for thromboembolism during aspirin therapy in patients with atrial fibrillation: the stroke prevention in atrial fibrillation study. *J Stroke Cerebrovasc Dis* 5(3): 147-157.
8. Watson T, Shantsila E, Lip GY (2009) Mechanisms of thrombogenesis in atrial fibrillation: Virchow's triad revisited. *Lancet* 373(9658): 155-166.
9. Stewart S, Hart CL, Hole DJ (2001) Population prevalence, incidence, and predictors of atrial fibrillation in the Renfrew/Paisley study. *Heart* 86(5): 516-521.
10. Heeringa J, van der KDA, Hofman A, Kors JA, Herpen VG, et al. (2006) Prevalence, incidence and lifetime risk of atrial fibrillation: the Rotterdam study. *Eur Heart J* 27(8): 949-953.
11. Atzema CL, Austin PC, Miller E, Chong AS, Yun L, et al. (2013) A population based description of atrial fibrillation in the emergency department, 2002 to 2010. *Ann Emerg Med* 62(6): 570-577.
12. Roy D, Talajic M, Nattel S, George DW, Paul D, et al. (2008) Rhythm control versus rate control for atrial fibrillation and heart failure. *N Engl J Med* 358: 2667-2677.
13. Wyse DG, Waldo AL, DiMarco JP, Domanski MJ, Rosenberg Y, et al. (2002) A comparison of rate control and rhythm control in patients with atrial fibrillation. *N Engl J Med* 347(23): 1825-1833.
14. Van Gelder IC, Groenveld HF, Crijns HJ, Tuininga YS, Tijssen JG, et al. (2010) Lenient versus strict rate control in patients with atrial fibrillation. *N Engl J Med* 362(15): 1363-1373.
15. Van Gelder IC, Hagens VE, Bosker HA, Kingma JH, Kamp O, et al. (2002) A comparison of rate control and rhythm control in patients with recurrent persistent atrial fibrillation. *N Engl J Med* 347(23): 1834-1840.
16. Carlsson J, Miketic S, Windeler J, Cuneo A, Haun S, et al. (2003) Randomized trial of rate-control versus rhythm-control in persistent atrial fibrillation. *J Am Coll Cardiol* 41(10): 1690-1696.
17. Opolski G, Torbicki A, Kosior DA, Szulc M, Wozakowska KB et al. (2004) Rate control vs rhythm control in patients with nonvalvular persistent atrial fibrillation: the results of the Polish How to Treat Chronic Atrial Fibrillation (HOT CAFE) Study. *Chest* 126(2): 476-486.
18. Hohnloser SH, Kuck KH, Lilienthal J (2000) Rhythm or rate control in atrial fibrillation—Pharmacological Intervention in Atrial Fibrillation (PIAF): a randomized trial. *Lancet* 356(9244): 1789-1794.
19. Caldeira D, David C, Sampaio C (2012) Rate versus rhythm controls in atrial fibrillation and clinical out-comes: updated systematic review and meta-analysis of randomized controlled trials. *Arch Cardiovasc Dis* 105(4): 226-238.
20. Atzema CL, Dorian P, Ivers NM et al. (2013) Evaluating early repeat emergency department use in patients with atrial fibrillation: a population-based analysis. *Am Heart J* 165(6): 939-948.
21. Vinson DR, Hoehn T, Graber DJ, Williams TM, et al. (2012) Managing emergency department patients with recent-onset atrial fibrillation. *J Emerg Med* 42(2): 139-148.
22. Scheuermeyer FX, Innes G, Pourvali R, Dewitt C, Grafstein E, et al. (2013) Missed Opportunities for Appropriate Anticoagulation Among Emergency Department Patients With Uncomplicated Atrial Fibrillation or Flutter. *Ann Emerg Med* 62(6): 557-565.



This work is licensed under Creative Commons Attribution 4.0 License
DOI: [10.19080/JAICM.2018.05.555675](https://doi.org/10.19080/JAICM.2018.05.555675)

Your next submission with Juniper Publishers

will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats
- (Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission

<https://juniperpublishers.com/online-submission.php>