



# Is delayed cardioversion the better approach in recent-onset atrial fibrillation? Yes

Giovanni Luca Botto<sup>1</sup> · Giovanni Tortora<sup>1</sup>

Received: 27 August 2019 / Accepted: 23 October 2019  
© Società Italiana di Medicina Interna (SIMI) 2019

## Abstract

Atrial fibrillation is the most common sustained arrhythmia encountered in primary care practice and represents a significant burden on the health care system with a higher than expected hospitalization rate from the emergency department. The first goal of therapy is to assess the patient's symptoms and hemodynamic status. There are multiple acute management strategies for atrial fibrillation including heart rate control, immediate direct-current cardioversion, or pharmacologic cardioversion. Given the variety of approaches to acute atrial fibrillation, it is often difficult to consistently provide cost-effectiveness care. The likelihood of spontaneous conversion of acute atrial fibrillation to sinus rhythm is reported to be really high. Although active cardioversion of recent-onset atrial fibrillation is generally considered to be safe, the question arises of whether the strategy of immediate treatment for a condition that is likely to resolve spontaneously is acceptable for hemodynamically stable patients. Based on published data, non-managed acute treatment of atrial fibrillation appears to be cost-saving. The observation of a patient with recent-onset atrial fibrillation in a dedicated unit within the emergency department reduces the need for acute cardioversion in almost two-thirds of the patients, and reduces the median length of stay, without negatively affecting long-term outcome, thus reducing the related health care costs. However, to let these results broadly applicable, defined treatment algorithms and access to prompt follow-up are needed, which may not be practical in all settings.

**Keywords** Atrial fibrillation · Wait and see · Emergency department · Cardioversion · Rate control

## Background

Atrial fibrillation (AF) is the most common sustained arrhythmia encountered in primary care practice, and very often it requires hospital admission [1].

AF represents a significant burden on the health care system with a higher than expected hospitalization rate from the emergency department (ED). In a large registry, 4570 consecutive patients admitted to the ED for AF/atrial flutter were enrolled in 207 Italian hospitals. Among these, 2838 (61.9%) were hospitalized (median stay 6 days). AF/atrial flutter represented 1.5% of all ED admissions and 3.3% of all hospitalizations [2].

The initial treatment of AF depends on the patient's time of presentation, symptoms, and hemodynamic status. Some

patients remain asymptomatic, making it difficult to estimate the time of onset and duration or severity of AF; on the other hand, many patients with AF present acutely because of symptoms.

There are multiple acute management strategies for AF including heart rate control, immediate direct-current (DC) cardioversion (CV), or pharmacologic CV [3]. Given the variety of approaches to acute AF, it is often difficult to consistently provide cost-effectiveness care.

## Recent-onset atrial fibrillation

AF shows up in a variety of forms. Paroxysmal AF is defined by recurrent episodes of AF that convert spontaneously to sinus rhythm (SR), whereas persistent AF requires CV (either electrical CV or pharmacologic CV) for reversion to SR. Permanent AF is either refractory to attempts at CV or CV is not attempted [1].

Patients presenting with acute AF are generally having an initial episode of AF. They present with a variety

✉ Giovanni Luca Botto  
gbotto@asst-rhodense.it

<sup>1</sup> Department of Electrophysiology and Clinical Arrhythmology, ASST Rhodense, Rho and Garbagnate M.se Hospitals, C.so Europa 250, Rho, 20017 Milan, Italy

of symptoms, a variety of clinical course, and in a variety of places. Therefore, different management strategies are available, making it difficult to offer the most efficient cost-effectiveness care in all cases.

Few patients with a recent-onset AF presenting to ED are asymptomatic; most of them have symptoms ranging from palpitation to dyspnea [4].

The first goal of therapy is to assess the patient's symptoms and hemodynamic status. Patients with hemodynamic instability require urgent DC-shock CV. Patients who are stable will often have relief of their symptoms with control of the ventricular rate. This can be easily achieved acutely with intravenous calcium-channel blockers or  $\beta$ -blockers. Digoxin has a slower onset of action making this compound less effective. After initial heart rate control has been achieved, oral medication can be substituted.

Most recent studies have demonstrated the safe CV of selected patients with acute AF in the ED, without requiring hospitalization [2, 5, 6].

Well-regarded international guidelines allow for the CV of acute AF in selected patients within a 48-h window of opportunity before anticoagulation must be instituted [1]. In patients with a duration of symptoms > 48 h, or in those with unknown duration of symptoms, CV must not be attempted without prior anticoagulation (or transesophageal echography able to exclude atrial thrombosis) [1].

### Spontaneous conversion of acute atrial fibrillation to sinus rhythm

The likelihood of spontaneous conversion of acute AF to SR is reported to be as high as 70% [7]. In a consecutive series of patient with AF of < 72-h duration, the occurrence of spontaneous conversion to SR occurred in 242/356 (68%) subjects. Logistic regression of clinical data identified presentation < 24 h from the onset of symptoms as the only predictor of spontaneous conversion.

Many other studies looking at pharmacologic agents versus placebo for reverting SR give us a clue as to the rate of spontaneous conversion of AF.

In a placebo-controlled study on patients with much longer AF duration ( $\leq 8$  days), but without clinical signs of heart failure, different active treatments were randomly compared. The conversion rate at 48 h in the placebo arm was 76% not different from oral loading (600 mg) of propafenone, or from digoxin plus oral quinidine [8]. Moreover, the rate of conversion to SR of recent-onset AF with placebo was 69% at 24 h, not different from oral loading of propafenone at different doses (450 mg and 600 mg, respectively 71% and 80%) [9]. One might conclude that "placebo" (leading to spontaneous conversion) is effective and safe for the treatment of acute AF.

Although active CV of recent-onset AF is generally considered to be safe, these data ask the question of whether the strategy of immediate treatment for a condition that is likely to resolve spontaneously is acceptable for hemodynamically stable patients.

### The "wait-and-see" approach

A non-standardized approach to the acute management of AF may be inefficient and costly. In this age of access block and limited resources, it is important to create protocols that maximize existing resources and ensure patient safety. Several studies have investigated the outcome and satisfaction of a protocol employing a "wait-and-see strategy" (WAS).

Based on retrospective data, non-managed acute treatment of AF appears to be cost-saving. In a chart review of all patients admitted to the hospital with a primary diagnosis of AF (secondary AF excluded), 114 patients met the inclusion criteria. In 47% of the cases, AF was first documented. The spontaneous conversion rate was 65%, and arrhythmia duration < 48 h was significantly more likely to convert. The hospital charges for spontaneous converters were  $\$4.930 \pm 2.741$ , significantly lower compared to those who underwent DC-CV ( $\$9.892 \pm 6.073$ ), and to patients who underwent pharmacologic CV ( $\$5.681 \pm 3.887$ ) [10].

The observation of a patient with recent-onset AF in a dedicated unit within the ED reduces the median length of stay from 10.1 h versus 25.2 h for patients who received routine in-hospital care, including electrical or pharmacologic CV [11].

Again, a WAS approach, that allows for spontaneous resumption of SR, reduced the need for acute CV in almost two-thirds of the patients presenting to an ED with recent-onset AF [12].

More recently, a noninferiority trial, the Rate Control versus Electrical Cardioversion Trial 7-Acute Cardioversion versus Wait And See (RACE 7 ACWAS) [13] included 437 patients who presented to an ED with recent-onset AF (< 36 h) [14]. None of the patients had history of persistent AF.

The trial randomly assigned patients to either immediate CV (early CV—ECV group) or a wait-and-see approach with medication (delayed CV—DCV group).

The primary end point was SR at 4 weeks after the initial ED visit. In the ECV group, approximately equal number of patients received electrical or pharmacologic CV. In the DCV group, rate control medication was used to achieve a heart rate < 110 beats/min and relief of symptoms. Then patients were discharged home, with an outpatient visit scheduled for the next day; if AF had not resolved, patients then received CV (as close as possible to 48 h after symptom onset).

Delayed CV based on WAS approach for recent-onset, symptomatic AF was just as good as acute CV in getting back patients to SR. At the 4-week evaluation, SR was present in 91% of the patients in DCV group and in 94% in the ECV group (criteria for non-inferiority met). In the DCV group, 69% of the patients had spontaneous resumption of SR. The median duration of the ED stay was shorter for the DCV group (120 min vs 158 min). The 30-min difference was statistically significant. No differences in quality of life or clinical outcomes have been detected between the two groups.

Those findings suggest that rate-control therapy alone can achieve prompt symptom relief in almost all eligible patients, with good quality of life and a low risk of complications, while facilitating rapid discharge from the ED. The results of the RACE 7 trial can be applied to a sizable population since 30% of the patients with AF who presented to the ED were eligible to participate in the trial.

A WAS is able to reduce the length of stay in the ED to 2 h, as compared with the 3–10 h expected from observational studies [3, 15, 16]. However, for these results to be broadly applicable, defined treatment algorithms and access to prompt follow-up are needed, which may not be practical in all settings [16]. What is absolutely required is a health care system able to see the patients again within 1 or 2 days after presentation to ED, to make this approach possible.

This is, in the opinion of the authors, the major limitation of the WAS approach.

## Long-term outcomes and conclusion

Within 1 year after a visit to an ED for AF, 5–10% of patients will die from any cause, and 10–20% will have a stroke/embolism, or myocardial infarction or be hospitalized for heart failure [17].

SR at the time of discharge from the ED seems to be associated with an improved prognosis, but this observation could be biased by some confounding factors since patients in SR tend to be healthier [18, 19].

In the RACE 7 study, early CV strategy did not significantly increase the rate of SR at 4 weeks, thus it is implausible that such treatment would improve long-term outcomes. However, long-term prognosis can be improved with oral anticoagulation prescription and risk factor modification [15, 17] which can be initially addressed in the ED visit and maybe effectively managed by a specialist group with routine follow-up. The role of the ED is indeed to manage the acute phase, while the long-term follow-up is clearly in the hands of cardiologists that will have the “mission” to organize the better for the patient. In light of the exposed data, we are facing a new era in which the ED and cardiologists play a major role to improve long-term outcomes for patients

[20]. The more attention we give to ED management, getting patients to strict follow-up care where aspects like not only anticoagulation, AF suppression, and maybe ablation but also risk factor management can be properly addressed, the better it will be for the global treatment of patients.

## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Statement of human and animal rights** This article does not contain any studies with human participants or animal performed by any of the authors.

**Informed consent** For this type of study, formal informed consent is not required.

## References

1. Kirchhof P, Benussi S, Kotecha D et al (2016) 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J* 37:2893–2962
2. Santini M, De Ferrari GM, Pandozi C et al (2004) Atrial fibrillation requiring urgent medical care. Approach and outcome in the various departments of admission. Data from the atrial Fibrillation/flutter Italian REgistry (FIRE). *It Heart J* 5:205–213
3. Stiell IG, Clement CM, Brison RJ et al (2011) Variation in management of recent-onset atrial fibrillation and flutter among academic hospital emergency departments. *Ann Emerg Med* 57:13–21
4. Lok NS, Lau CP (1995) Presentation and management of patients admitted with atrial fibrillation: a review of 291 cases in a regional hospital. *Int J Cardiol* 48:271–278
5. Burton JH, Vinson DR, Drummond K et al (2004) Electrical cardioversion of emergency department patients with atrial fibrillation. *Ann Emerg Med* 44:20–30
6. Stiell IG, Clement CM, Symington C et al (2007) Emergency department use of intravenous proinamide for patients with acute atrial fibrillation or flutter. *Acad Emerg Med* 14:1158–1164
7. Danias PG, Caulfield TA, Weigner MJ et al (1998) Likelihood of spontaneous conversion of atrial fibrillation to sinus rhythm. *J Am Coll Cardiol* 31:588–592
8. Capucci A, Boriani G, Rubino I et al (1994) A controller study on oral propafenone versus digoxin plus quinidine in converting recent onset atrial fibrillation to sinus rhythm. *Int J Cardiol* 43:305–313
9. Botto GL, Capucci A, Bonini W et al (1997) Conversion of recent onset atrial fibrillation to sinus rhythm using a single oral loading dose of propafenone: comparison of two regimens. *Int J Cardiol* 58:55–61
10. Dell’Orfano JT, Patel H, Wolbrette DL et al (1999) Acute treatment of atrial fibrillation: spontaneous conversion rates and cost of care. *Am J Cardiol* 83:788–790
11. Decker WW, Smars PA, Vaidyanathan L et al (2008) A prospective, randomized trial of an emergency department observation unit for acute onset atrial fibrillation. *Ann Emerg Med* 52:322–328
12. Doyle B, Reeves M (2011) “Wait and see” approach to the emergency department cardioversion of acute atrial fibrillation. *Emerg Med Int* 2011:545023

13. Dudink E, Essers B, Holvoet W et al (2017) Acute cardioversion vs a wait-and-see approach for recent-onset symptomatic atrial fibrillation in the emergency department: rationale and design of the randomized ACWAS trial. *Am Heart J* 183:49–53
14. Pluymaekers NAHA, Dudink EAMP, Luermans JGLM et al (2019) Early or delayed cardioversion in recent-onset atrial fibrillation. *N Engl J Med* 380:1499–1508
15. Barbic D, DeWitt C, Harris D et al (2018) Implementation of an emergency department atrial fibrillation and flutter pathway improves rates of appropriate anticoagulation, reduces length of stay and thirty-day revisit rates for congestive heart failure. *CJEM* 20:392–400
16. Baugh CW, Clark CL, Wilson JW et al (2018) Creation and implementation of an outpatient pathway for atrial fibrillation in the emergency department setting: results of an expert panel. *Acad Emerg Med* 25:1065–1075
17. Healey JS, Oldgren J, Ezekowitz M et al (2016) Occurrence of death and stroke in patients in 47 countries 1 year after presenting with atrial fibrillation: a cohort study. *Lancet* 388:1161–1169
18. Pisters R, Nieuwlaat R, Prins MH et al (2012) Clinical correlates of immediate success and outcome at 1-year follow-up of real-world cardioversion of atrial fibrillation: the Euro Heart Survey. *Europace* 14:666–674
19. Stiell IG, Clement CM, Rowe BH et al (2017) Outcomes for emergency department patients with recent-onset atrial fibrillation and flutter treated in Canadian hospitals. *Ann Emerg Med* 69(562–571):e2
20. Healey JS, McIntyre WF (2019) The RACE to treat atrial fibrillation in the emergency department. *N Engl J Med* 380:1578–1579

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.