REVIEW
Actualities of the 2024 ESC Guidelines for the Management of Atrial Fibrillation

Maria POPESCU[1], Camelia Cristina DIACONU[1,2,3]

[1]*Internal Medicine Department, Clinical Emergency Hospital of Bucharest, Romania*
[2]*Faculty of Medicine, University of Medicine and Pharmacy Carol Davila Bucharest, Romania*
[3]*Academy of Romanian Scientists, Bucharest, Romania*

Correspondence to: Maria Popescu, *Internal Medicine Department, Clinical Emergency Hospital of Bucharest, Romania; e-mail:* mariacrpopescu@gmail.com

Abstract. Patients with atrial fibrillation (AF) need constant care and attention, requiring interdisciplinary medical teams and periodic overview of the literature in the matter of treatment. Thus, the recent recommendations regarding prevention, management and treatment of AF according to the 30th of August 2024 European Society of Cardiology (ESC) Guidelines offer us a new and improved perspective of the medical act. In this review we aim to emphasize the newest data and also to draw attention to the differences between the 2020 ESC Guidelines for the diagnosis and management of AF developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS) and the 2024 ESC Guidelines for the management of AF.

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1. INTRODUCTION AND CLASSIFICATION

Atrial fibrillation (AF) is one of the most common heart rhythm conditions. Its prevalence is supposed to double in the next few decades due to several factors: aging of the population, increasing number of comorbidities per individual, and more often detection of AF thanks to the latest technologies [1].

For practical use, AF is classified into two main categories, one of them by temporal pattern and the other one by clinical concepts. The first of them is the most used and known classification of AF, and it subdivides into four groups:

- First-diagnosed AF – Episode of AF detected for the first time, disregarding the debut, temporal pattern, duration and afferent symptoms.
- Paroxysmal AF – Ends spontaneously or via intervention in less than 7 days. The majority of self-terminating paroxysms last less than 48 hours [2].
- Persistent AF – Refers to AF episodes that are not self-terminating, having a 7 days cut-off duration [3]. Long-standing persistent AF represents continuous AF for a period of at least 12 months, still having treatment options for rhythm control.
- Permanent AF – The attempt for conversion to sinus rhythm is no longer an option after a common decision taken between the physician and the patient [4].

Relayed to the clinical classification of AF, it divides into the following categories:

- Clinical AF – Displayed by an electrocardiography (ECG), associating symptoms or not.
- Device-detected subclinical AF – No symptom-related AF episodes, detected with the assistance of continuous monitoring devices [5].

- Recent-onset AF – Requires establishing the method of cardioversion, either pharmacological or electrical, but the cut-off time interval to delineate this entity has not yet been settled [6].
- Trigger-induced AF – New AF episode, which is close to a potentially reversible factor.
- Early AF – The interval between detecting an underlying cardiomyopathy and an AF episode ranges up from 3 to 24 months [7].

Trigger-induced AF is clinically significant and may manifest in various contexts, including acute conditions (such as infections, critical conditions, excessive alcohol intake, surgical procedures) or chronic conditions (such as obesity, obstructive sleep apnea, malignancies, stress, and immune-mediated disorders) [8]. In this particular case of AF, the guidelines recommend that patients at high thromboembolic risk should be taken into consideration for long-term anticoagulation in order to prevent systemic thromboembolism and ischemic stroke.

2. CLINICAL AND PARACLINICAL MATTERS

AF can significantly affect quality of life when accompanied by symptoms such as palpitations, chest pain, dyspnea, fatigue, dizziness, syncope, anxiety, sleep disturbances, and others. The guidelines provide a class I, level B recommendation to utilize the modified European Heart Rhythm Association (mEHRA) symptom categorization prior to and during significant treatment decisions to measure symptom burden [9] .

The diagnostic work-up should include:

- Medical history and comorbidities, relevant family history.
- 12-lead ECG according to 2020 Guidelines (class I, level B recommendation) [10] or 12-lead, multiple, or single leads electrocardiogram according to 2024 ESC Guidelines (class I, level A recommendation) [9].
- Blood tests (full blood count, serum electrolytes, liver function, kidney function, glucose/HbA1c and thyroid function) to detect any concomitant conditions that may aggravate AF [11].
- Transthoracic echocardiography is recommended for all patients diagnosed with atrial fibrillation, classified as a class I, level C recommendation. In particular cases, brain imaging and cognitive function assessment will be conducted for any underlying cerebrovascular illness [9].

Transthoracic echocardiography is the fastest and most utilized of the imaging procedures, helping us to follow the AF-CARE pathway, which stands for [12]:

a. Comorbidity and risk factor management, including evaluating the left ventricular ejection fraction and other cardiac indices, presence or absence of pericardial fluid or valvular disease [13].
b. Avoid stroke and thromboembolism, meaning detection of heart failure or moderate-severe mitral stenosis, in order to choose the suitable anticoagulant.
c. Reduce symptoms by rate and rhythm control by objectifying the left ventricular ejection fraction and severity of valvular disease, establishing choice of rate and rhythm control treatment.
d. Evaluation and dynamic reassessment of the known valve disease for monitoring their severity [9].

3. SCREENING AND PRIMARY PREVENTION

The accuracy of AF prevalence estimates increases with the rigor of screening practices. Initial detection can be readily undertaken by cardiologists, internists, or general practitioners through a simple yet effective method: pulse palpation. More advanced identification of at-risk individuals may involve the use of artificial intelligence–driven algorithms and electrocardiogram (ECG)-based devices [14].

Furthermore, two additional Class I guideline-recommended strategies support improved detection:

a. Systematic review of ECG recordings to confirm the diagnosis of atrial fibrillation.

b. Routine heart rhythm assessment during medical check-ups for all individuals aged ≥65 years [9] .

Primary prevention is crucial and more important than treatment itself. For this matter, the 2024 guidelines bring to light many recommendations that involve the management of cardiovascular risk factors and healthier ways of living, starting from little everyday life choices. On one hand, it is recommended to maintain optimal blood pressure with angiotensin-converting-enzyme inhibitors (ACEi) or angiotensin receptor blockers (ARBs) as the first choice of treatment for hypertensive patients [15] and to prescribe adequate medical therapy for individuals suffering from heart failure with reduced ejection fraction (HFrEF). On the other hand, it is recommended to endorse an active lifestyle (150-300 minutes of moderate activity per week or 75-150 minutes of vigorous physical activity per week), to maintain a normal body mass index (20-25kg/m^2) and to avoid excess alcohol consumption [16].

4. ANTICOAGULATION TREATMENT

Following a confirmed diagnosis of AF, periodic reassessment of thromboembolic risk is recommended using the updated CHA_2DS_2-VA score, to guide timely initiation of anticoagulant therapy in appropriate patients. This revised score differs from the previously used CHA_2DS_2-VASc score outlined in the 2020 Guidelines by the removal of the sex category [10] [17]. According to current recommendations, oral anticoagulation is indicated in patients with AF who present a high thromboembolic risk, defined as a CHA_2DS_2-VA score ≥2. Importantly, a score of 1 should also be considered as indicative of elevated risk and warrants evaluation for initiating anticoagulation. Independent of CHA_2DS_2-VA score, the presence of certain structural cardiomyopathies—specifically hypertrophic cardiomyopathy or cardiac amyloidosis—constitutes a class I indication for initiating oral anticoagulation [9].

Given the heterogeneity of patient profiles and the frequent presence of comorbidities, anticoagulant therapy must be individualized. Physicians are required to select the most appropriate agent based on clinical context and underlying conditions. Direct oral anticoagulants (DOACs) are currently recommended as a Class I, Level A therapy for stroke and thromboembolism prevention in AF, except for patients with moderate-to-severe mitral stenosis or mechanical heart valves, in whom vitamin K antagonists (VKAs) remain indicated [18]. For patients with AF receiving VKA therapy, maintaining a therapeutic international normalized ratio (INR) between 2.0 and 3.0 is essential. In cases where therapeutic INR levels cannot be consistently achieved, a switch to a DOAC is recommended in eligible individuals.

Additionally, current guidelines include several Class III (harm) recommendations [9]:

- Avoid combining antiplatelet therapy with oral anticoagulation unless explicitly indicated.
- Avoid switching between DOACs or between a DOAC and a VKA solely for the purpose of stroke prevention.

5. OTHER PYLONS OF TREATMENT

In the acute phase of AF, initiation of rate control therapy is recommended either as monotherapy or in combination with rhythm control therapy, with the aim of symptom reduction. The target is to achieve an initial resting heart rate of less than 110 beats per minute, with stricter control warranted in patients who experience persistent AF-related symptoms [19].

For patients with a left ventricular ejection fraction (LVEF) greater than 40%, first-line pharmacologic options for rate control include beta-blockers, nondihydropyridine calcium channel blockers (such as verapamil or diltiazem), or digoxin. In contrast, for patients with heart failure and LVEF ≤40%, only beta-

blockers and/or digoxin are recommended for heart rate control, as calcium channel blockers are contraindicated in this subgroup [9].

In what concerns rhythm control, there are some few treatment options:

A. Electrical or pharmacological cardioversion.
B. Chronic antiarrhythmic therapy.
C. Catheter ablation.
D. Surgical ablation.

The decision of electrical cardioversion is rigorously and differently done depending on the hemodynamic status of the patient. In front of a hemodynamically unstable patient, immediate electrical cardioversion is required. After cardioversion, all patients are recommended to continue oral anticoagulation for at least 4 weeks regardless of CHA_2DS_2-VA score value, and in those with thromboembolic risk factors, whether sinus rhythm is obtained or not, long-term oral anticoagulation is recommended [9]. If the patient is hemodynamically stable, cardioversion is initiated depending on the anticoagulation status. Thus, for those under oral anticoagulation for at least the past 3 weeks, on one hand, if they have persistent AF, they will undergo electrical or pharmacological cardioversion; on the other hand, if they have paroxysmal AF, they will be monitored in the next 48 hours for an eventual spontaneous conversion to sinus rhythm [20]. For those patients who didn't follow oral anticoagulation treatment for the last 3 weeks, firstly they would be supervised for the appearance of spontaneous cardioversion, and in its absence, they will receive anticoagulant therapy for at least 3 weeks, followed by transesophageal echocardiography (TEE) and ulterior electrical cardioversion [21]. It is worth mentioning that the 2024 Guidelines recommend DOAC in detriment of VKAs for any suitable patient for electrical cardioversion [9].

Pharmacological cardioversion in AF is achieved through the administration of antiarrhythmic agents. In cases of recent-onset AF, class I recommendations include intravenous flecainide or propafenone, which are effective but contraindicated in patients with left ventricular hypertrophy (LVH), HFrEF, or coronary artery disease (CAD). In patients with AF and coexisting HFrEF (LVEF≤40%), intravenous vernakalant or amiodarone, both classified as class III antiarrhythmics, are strongly recommended [9].

Regarding chronic antiarrhythmic therapy, several class I recommendations are currently endorsed. For patients with AF and HFrEF or CAD, amiodarone, flecainide, or propafenone may be used, with the caveat of close monitoring for extracardiac toxicity in those receiving amiodarone. In contrast, dronedarone is the preferred option in patients with AF and heart failure with mildly reduced ejection fraction (HFmrEF), preserved ejection fraction (HFpEF), valvular heart disease, or ischemic cardiomyopathy [9].

Catheter ablation represents the next step in rhythm control strategies for AF. It is a Class I recommendation for patients with paroxysmal or persistent AF who remain symptomatic despite antiarrhythmic drug therapy, following a shared decision-making process between the patient and clinician, considering the potential benefits, procedural risks, and individual risk factors for AF recurrence [22].

According to the 2020 ESC Guidelines, catheter ablation could be considered as a first-line therapy in selected patients with symptomatic paroxysmal AF, a class II recommendation [10]. However, this approach has been upgraded to a class I recommendation in the 2024 Guidelines, which emphasize that catheter ablation is now recommended as a first-line treatment in patients with paroxysmal AF to reduce symptoms and delay AF progression [9] .

Surgical ablation is an elaborate procedure requiring an experienced team of electrophysiologists and arrhythmia surgeons, and it is recommended to be performed at the

same time as mitral valve surgery in patients with AF. To guide surgical strategy, in patients undergoing surgical ablation, intraprocedural imaging is recommended for detection of left atrial thrombus, independent of oral anticoagulation use [9].

6. BLEEDING RISK

AF is an intricate condition with an important thromboembolic risk on one hand, but associated bleeding risk because of anticoagulation treatment use and associated cardiovascular comorbidities on the other hand. In this matter, there are some differences between the two recent guidelines. Thus, the 2020 Guidelines recommended considering using the HAS-BLED score to help address modifiable bleeding risk factors, this being a class IIa recommendation [10]. Patients having a HAS-BLED score ≥3 were considered at high bleeding risk. The 2024 Guidelines upgraded this recommendation, turning it into a class I recommendation, highlighting that management of modifiable bleeding risk factors has to be performed in all patients suitable for oral anticoagulation [9].

CONCLUSIONS

In summary, AF is the most prevalent cardiac arrhythmia, with its global burden projected to double in the coming decades [1]. Given its often asymptomatic nature, routine heart rhythm screening is strongly recommended in individuals aged ≥65 years, to facilitate early detection and intervention. The CHA_2DS_2-VA score, an updated thromboembolic risk stratification tool for non-valvular AF, serves as a clinical guide for initiating oral anticoagulation. In the majority of patients, DOACs remain the preferred therapeutic option over vitamin K antagonists [9]. Beyond stroke prevention, AF encompasses a broad spectrum of clinical challenges, including symptom burden, impact on quality of life, and modifiable bleeding risks. Accordingly, the 2024 ESC Guidelines emphasize the importance of AF screening and primary prevention, while also underscoring the need for periodic clinical assessment, appropriate use of imaging modalities, and individualized therapeutic decisions aimed at mitigating symptoms and halting disease progression once the diagnosis is established.

Author Contributions:

C.C.D. and M.P. conceived the original draft preparation. M.P. was responsible for conception and design of the review. M.P. was responsible for the data acquisition and for the collection and assembly of the articles/published data, and their inclusion and interpretation in this review. All authors contributed to the critical revision of the manuscript for valuable intellectual content. All authors have read and agreed with the final version of the manuscript.

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