

Literature Review On Management Of Atrial Fibrillation And Its Implementation In Rural Areas

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ARTICLE INFO	ABSTRACT
Keywords: Atrial fibrillation, management, rural areas	Atrial fibrillation (AF) is a common and chronic heart condition affecting patients in various healthcare settings, including rural clinics. The purpose of this review is to discuss management of AF and its implementation in rural areas. The review employs traditional literature review methodologies through literature obtained from Google Scholar and PubMed. This literature review considers both retrospective and prospective studies, and includes guidelines from official health organizations. Based on the review, AF management often intersects with other health conditions, thus it can be a marker of stroke risk and an indicator of serious diseases. Rural areas physicians face challenges in implementing accurate diagnostics and adopting new treatments while coordinating with specialists to provide comprehensive care. Well-integrated AF management ultimately aims to simplify the treatment options and improve the quality of patient care, especially in rural areas
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1. INTRODUCTION

Atrial fibrillation (AF) is a common cardiac arrhythmia. The prevalence of atrial fibrillation increases with age, and usually coexists with other comorbidities typically treated in primary care settings, such as hypertension, sleep apnea, and obesity. 1 Atrial fibrillation is often asymptomatic, but many patients experience bothersome palpitations, shortness of breath, or exercise intolerance.1,2 Atrial fibrillation is often associated with complications of heart failure, stroke and death.3,4,5

In rural areas, which have limited facilities and difficult access to adequate services for a complete cardiac examination, it is very difficult to establish a diagnosis of AF in patients even if there are appropriate symptoms. Therefore, although diagnostic methods are increasingly available, in rural areas much atrial fibrillation goes undetected and cannot be diagnosed.6

Management of AF involves two main principles: prevention of stroke and systemic embolism and control of symptoms with rate or rhythm control strategies. 7 In recent years, increasingly advanced technology and patient monitoring have made rhythm control-based strategies increasingly popular. 7 However, therapeutic management of AF in rural areas is a challenge in itself. Inadequate access to health facilities is often a barrier, so special strategies are needed to provide optimal care for AF patients in these areas.6

This literature will provide a narrative overview of AF therapy management starting from epidemiological features, risk factors, various types of AF therapy, AF management in urban areas and remote areas, accompanied by comparisons of treatment and mortality rates between urban and remote areas, adjustments to management protocols and existing challenges and obstacles and efforts to overcome them.

2. METHOD

The research uses a literature review method with narrative data presentation. Journals used in this literature review were searched using the search keywords Atrial Fibrillation Management OR Rural Areas OR Primary Care Setting. The author includes criteria for retrospective, prospective studies and other literature reviews related to the topic of writing this literature review. The journal databases used to search for these journals are Google Scholar and Pubmed. Guidelines and websites from national or international organizations are also included in this literature review.

3. RESULTS AND DISCUSSION

Epidemiology and Risk Factors of AF

The incidence and prevalence of atrial fibrillation has increased over the past 20 years. 8 The increasing prevalence of AF is most likely due to the increase in multiple morbidities and older age as well as technological advances in diagnosis so that arrhythmias can be identified earlier. 9 In a subsequent study, it was stated that the prevalence number may not be the actual number because most of the patients who have atrial fibrillation do not have symptoms and so have not been diagnosed in health facilities. 10

Risk factors that can cause AF are usually multifactorial, consisting of heart failure, heart valve disease, coronary artery disease (CAD), vascular disease, hypertension, Diabetes Mellitus (DM), chronic kidney disease (CKD), lack of active exercise, alcohol consumption, smoking, obesity, inflammatory diseases, chronic obstructive pulmonary disease (COPD), obstructive sleep apnea, acute illnesses, surgery, hyperthyroidism. 11 Therefore, it is very important that when these risk factors are discovered, immediate management is carried out in order to reduce the burden of AF and complications from AF itself. In this case, what can be done in remote areas, especially in community health centers, is to correctly identify the diseases that are risk factors and refer patients if necessary to get better treatment, provide adequate follow-up therapy and are available at the community health center for patients. as well as providing good education to residents around the health center regarding risk factors that can be avoided. In addition, there are factors that cannot be prevented or intervened, namely aging, genetics, ethnic origin and male gender. 12 This must be informed to patients who have these risk factor criteria.

Therapeutic Management of AF

Management of AF is slightly different in each country. 13 The American Heart Association (AHA) itself has management guidelines that are based on 4 pillars, namely: improving lifestyle, strategic control of heart rate and rhythm and reducing the risk of stroke (figure 1). 14 Specific therapy options for AF range from the simplest by administering medication to interventional therapy such as catheter ablation, pacemaker implantation and even surgery. The choice of therapy is determined based on the patient's condition after a complete assessment has been carried out.

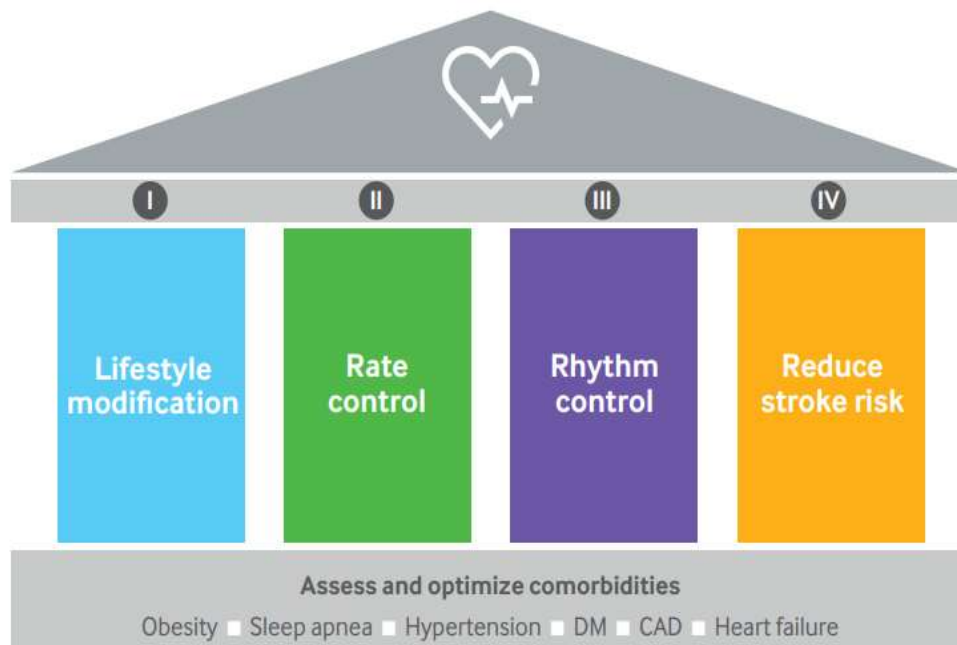


Figure 1 pillars of AF management based on AHA guidelines ¹⁴

Pharmacological Therapy in AF

Based on the previous 4 pillars, it can be concluded that drug therapy for AF aims to control the rhythm, rate and prevent stroke. Therapy to control rhythm focuses on maintaining sinus rhythm unchanged and this is mandatory therapy for patients aged under 65 years with severe symptoms or the first diagnosis is AF. 15 The aim of this therapy is to improve quality of life and reduce symptoms.

Rate-control therapy more beneficial for patients over 65 years of age with minimal symptoms.¹⁶ Stroke prevention in AF patients needs to be done because AF patients are 5 times more likely to suffer a stroke.¹⁷

Rhythm Control Therapy

As previously explained, maintaining sinus rhythm in AF patients is the priority in AF treatment. But not all patient conditions can be given the same medicine. Therefore, the choice of medication for patients needs to pay attention to its safety and efficacy. Class Ic and IIIC antiarrhythmic drugs are frequently used to maintain sinus rhythm (table 1). Class Ic drugs (flecainide and propafenone) are recommended for paroxysmal AF but are contraindicated in patients with AF accompanied by underlying structural heart disease.¹⁶

Table 1. Anti-Arrhythmic Drugs to Maintain Sinus Rhythm

Drug	Route	Dose	Contraindications
Flecainide ¹⁸	Orally	50-150 mg, 2 times a day	Systemic or Structural Heart Disease ; Sinus Node Dysfunction, 2-3 degree AV Block or Bundle Branch Block without pacemaker
	IV	1.5-2 mg/kgBB, over 10 minutes	
Propafenone ¹⁸	Orally	150-300 mg, 3 times a day	Systemic or Structural Heart Disease; Sinus Node Dysfunction, 2-3 degree AV Block or Bundle Branch Block without pacemaker
	IV	1.5-2 mg/ kgbb, over 10 minutes	
Sotalol ¹⁸	Orally	80-160 mg, 2 times a day	Asthma; Creatinine Clearance < 40 ml/minute; Left ventricular dysfunction; QTc > 450 ms; sinus bradycardia < 50 bpm. 2nd or 3rd degree AV block without pacemaker
Amiodarone ¹⁸	Orally	200 mg, 3 times daily for a week; 2 times a day for a week; Maintenance dose 200 mg once a day	Severe lung disease, severe liver disease, thyroid dysfunction
	IV	5-7 mg/kgbb	
Ibutilide ¹⁸	IV	1 mg over 10 minutes, again with the same dose after a 10 minute break	QT prolongation, Hypokalemia, Severe left ventricular hypertrophy or Low Ejection Fraction
Dronedaron ¹⁸	Orally	400 mg, 2 times a day	Permanent AF, NYHA Class III-IV Heart Failure; QTc > 500 ms; Severe Liver Disease

Treatment with sotalol, amiodarone, ibutilide or dofetilide which are class IIIc is more often chosen because of its effect of prolonging the duration of the action potential so it is recommended for the treatment of persistent AF and also for AF accompanied by structural heart disease.¹⁶

Heart Rate (HR) Control Therapy

Based on AF therapy guidelines from the *European Society of Cardiology* (ESC)¹⁸, AF patients have a target HR at rest that falls below 110 x/m. Drugs commonly used to control HR are drugs from the beta blocker group, *non-dihydropyridine calcium channel blockers* (ND-CCB), digitalis and amiodarone (table 2).

Table 2. List of Drugs for HR Control

Drug	Route	Dose	Contraindications
Metoprolol (tartrate) ^{18.27}	Orally	25-100 mg, 2 times a day	Acute Pulmonary Edema; Heart failure; Severe AV Block; Severe Depression Patients
Metoprolol (succinate) ^{18.27}	Orally	50-400 mg, once a day	
Bisoprolol ^{18.27}	Orally	2.5-10 mg, once a day	
Atenolol ^{18.27}	Orally	25-100 mg, once a day	
Diltiazem ^{18.27}	Orally	120-360 mg, 4 times a day	Severe hypotension, cardiogenic shock,
	IV	0.25 mg/kgBW, bolus over 2	

Drug	Route	Dose	Contraindications
Verapamil ^{18,27}	Orally	minutes, then 5-15 mg/hour 80-160 mg, 2 times a day	2nd/3rd degree AV block without pacemaker, left ventricular dysfunction and decompensated heart failure
	IV	0.077-0.15 mg/kgbb bolus over 2 minutes, then 0.005 mg/kgbb/minute infusion	
Digoxin ^{18,27}	Orally	0.125-0.25 mg, once a day	Ventricular tachycardia, Hypertrophic Obstructive Cardiomyopathy
	IV	0.25 mg bolus and the dose can be repeated at a maximum of 1.5 mg in 24 hours	
Amiodarone ^{18,27}	Orally	100-200 mg, once a day	Severe sinus node dysfunction, 2nd/3rd degree AV block, Bundle Branch Disease, Syncope due to bradycardia
	IV	300 mg IV over 1 hour, then 10-50 mg/hour for 1 day	

Beta blockers are the first choice of therapy because of their optimal effect on reducing heart rate and their benefits in patient survival. Beta blockers that are often used are metoprolol, bisoprolol and atenolol. 11 Contraindications that need to be considered are acute pulmonary edema, heart failure, asthma, severe AV block and very severe depression.

It is recommended that patients with COPD or asthma use ND-CCB, one of which is diltiazem and verapamil. If several previous medications are ineffective or are contraindicated for administration, digitalis can be considered as an alternative, especially in patients with kidney failure or hypotension. Amiodarone can be considered for short-term treatment because of its effects which also inhibit the sympathetic nervous system, but is not recommended for long-term treatment. 11

The ESC guidelines use LVEF = 40% as the treatment benchmark. LVEF more than 40% can use beta blockers, ND-CCB and digitalis to control HR. 18 At LVEF below 40%, beta blockers should be given from the lowest dose while ND-CCB should not be given. 18

Stroke Prevention Therapy

Anticoagulant therapy is highly recommended for stroke prevention in AF patients. Before administering anticoagulants, scoring can be done first using CHA2DS2-VASc (Table 3) and HAS-BLED (Table 4). The CHA2DS2-VASc scoring system is useful in estimating patient risk and determining therapy. Anticoagulant therapy can be given if the score is more than or equal to 2. 19 This scoring system cannot be applied to AF patients with severe mitral stenosis, atrial thrombus, cardiomyopathy, or congenital heart disease. In this situation, immediate anticoagulant is recommended. HAS-BLED is a scoring system used to estimate the risk of bleeding in patients. A score of 0 indicates low risk, 1-2 indicates moderate risk, and more than or equal to 3 indicates high risk. The HAS-BLED score is not necessarily the basis for the use of anticoagulants because many factors are taken into consideration, especially if the patient has certain disease conditions. 1,20 HAS-BLED score is used more to sort out patients who require closer monitoring rather than to determine the need for anticoagulation or not. 1

Anticoagulants that can be used are *New Oral Anticoagulant* (NOAC) and *Oral Anticoagulant* (OAC). Referring to the ESC guidelines, NOAC is the first choice of therapy unless the patient has contraindications so the alternative is OAC. 18 In one study, there were results that concluded that NOACs had higher efficacy and safety in Asian people than in non-Asian people. 21 In AF patients with severe mitral stenosis or other mechanical valve disease, OAC is recommended. 18

Table 3. CHA2DS2-VASc Scoring System

Risk factor	Score
Chronic Heart Failure	1
Hypertension	1
Age, 75 years	2

Risk factor	Score
Diabetes	1
History of stroke/TIA	2
Vascular Disease	1
Age 65-74 years	1
Female Gender	1

Table 4. CHA2DS2-VASc Scoring System

Risk factor	Score
Hypertension	1
Impaired kidney function	1
Liver function disorders	1
Strokes	1
History of bleeding	1
Labile INR 1 (>65 yrs)	1
Labile INR	1
Old age (>65 years)	1
Take medication together	1
Drink alcohol	1

As an additional note, the combination of OACs and antiplatelets is not recommended because it can increase the risk of stroke in old age.²² The administration of anticoagulant therapy must also be closely monitored to ensure its efficacy and safety. Of all the drugs listed in the table, we can see that there are not many drugs available in remote areas. This can be a consideration for doctors in remote areas.

Upstream Treatment t (upstream therapy)

Upstream therapy is therapy that uses non-anti-arrhythmic drugs that work on the mechanism of AF with the aim of reducing the possibility of AF appearing in patients given therapy.²³ A study result states that administering angiotensin converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) can inhibit or even restore the remodeling process of the heart's atria in patients with hypertension or left ventricular heart disease.²⁴ Inhibition of atrial remodeling ultimately inhibits the emergence of AF. Prevention and providing therapy related to risk factors and providing *upstream therapy* are effective in reducing the prevalence of AF.²⁵

Direct Current Cardioversion (DCC)

DCC is an effective therapy for rapid restoration of sinus rhythm. This therapy is an option for AF with hemodynamic disorders (figure 2).²⁶ A change from AF to sinus rhythm is associated with an increased risk of stroke. Therefore, anticoagulant administration needs to be carried out for approximately 4 weeks.²⁵

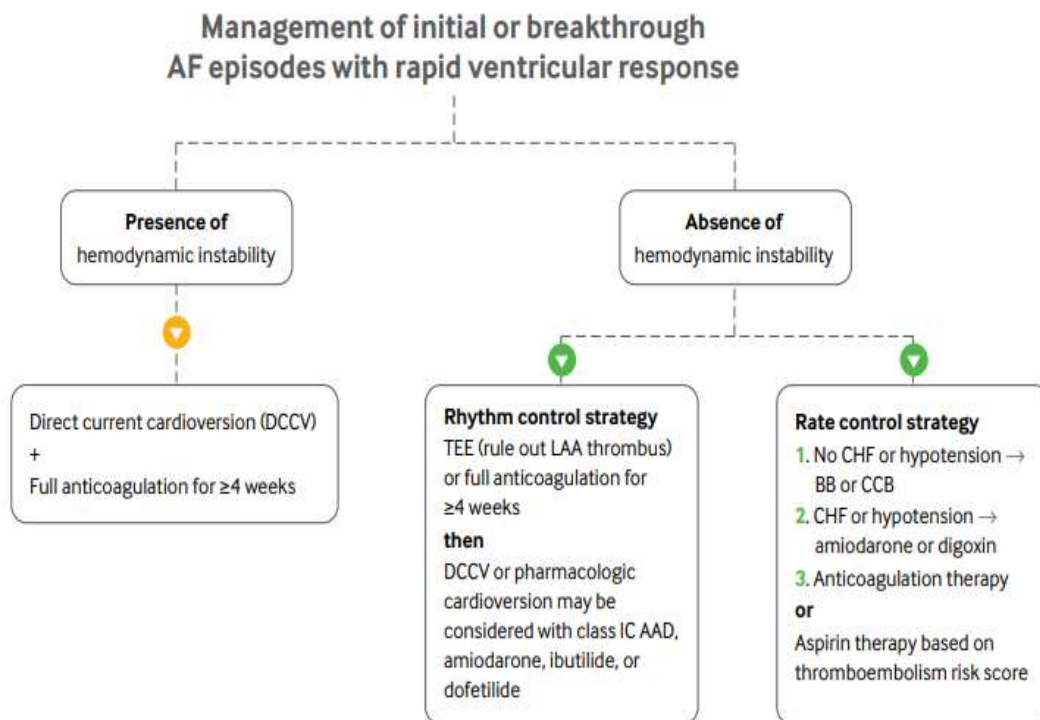


Figure 2. Algorithm for Management of AF Episodes with Rapid Ventricular Response ¹
AAD=antiarrhythmic drug; BB=beta blocker; CCA=calcium channel antagonist; CHF=congestive heart failure; LAA=left atrial appendage; TEE=transesophageal echocardiography

Management of AF in rural areas

Apart from the methods above, there are other methods that are also recommended for AF patients if the methods above are no longer effective. These methods are, Radiofrequency Catheter Ablation (RFCA), Cryoballoon Ablation, Left Atrial Appendage Closure (LAAC) and Surgery. ²⁶ However, it is not possible for these methods to be implemented in first-level health facilities, let alone in rural areas.

AF can get appropriate initial treatment in remote areas if mandatory facilities such as ECG and medicines are available. Indonesian Government Medicines for anticoagulants, anti-arrhythmias and other supporting medicines should be available at several health centers in rural areas. When treating AF in remote areas, it is necessary to pay attention to the effectiveness of the drugs given and a well-integrated referral system. If the medication given does not show good effectiveness, it is necessary to consider referring to a heart specialist. ^{1,27}

The referral system must be well integrated so that doctors or health workers in remote areas who want to refer to advanced health facilities can plan their referrals well. This is related to the patient's condition which requires appropriate and fast management. ^{1,28} The ESC's AF management guidelines also recommend a specialist multidisciplinary approach in the management of AF therapy. ²⁹

There are studies that state that patients whose AF is detected and referred quickly at an early stage have better health conditions in subsequent treatment. ²⁸ Because of this, the role of general practitioners working at community health centers is very important, because the sooner AF patients are detected, the faster the referral process can be carried out.

4. CONCLUSION

Based on the results of a literature review, it was found that the prevalence of AF globally is increasing due to the aging population and increasing technology for detecting AF itself. Along with the development of medical technology, AF management is also developing. Early diagnosis and management of AF in remote areas is becoming more feasible. Referral to a heart specialist can be done more quickly, thereby improving the prognosis of AF patients who come from rural areas. It is

recommended that further studies be carried out in rural areas in Indonesia so that an overview of the management of AF can be obtained which can later be used as material for consideration by the government to improve health services related to heart health .

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