Review Article

Treatment of atrial fibrillation: a comprehensive review and practice guide

Jianhua Li, Mei Gao, Minwei Zhang, Donglu Liu, Zhan Li, Juanjuan Du, Yinglong Hou

Abstract

Atrial fibrillation (AF) is an ectopic rhythm originating in the atrium. AF is the most common sustained cardiac arrhythmia in clinical practice and it is an enormous burden worldwide because of the high rates of morbidity, disability and mortality. Treatment of AF has become a hot spot in the field of cardiovascular medicine. Recently, increasing evidence and advancements in medical technology have helped us gain a better understanding of AF. As a result, management of AF has evolved in the past few years, so that we can better prevent and control AF. Current therapy for AF mainly includes drug therapy, catheter ablation, cryoballoon ablation, left atrial appendage closure and the maze procedure. The goal of this article is to update current treatment options for AF. We hope that this article will help deliver good care to AF patients based on the current state-of-the-art evidence.

Keywords: atrial fibrillation, drug therapy, catheter ablation, cryoballoon ablation, left atrial appendage closure, maze procedure

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Atrial fibrillation (AF) is an ectopic rhythm originating in the atrium. An electrocardiogram (ECG) of AF shows the normal sinus P waves are replaced by f waves (350 to 600 beats per min) and the ventricular rate is often irregular, which is characterised by an uneven R-R interval.[1,2] The prevalence of AF is higher in men than in women and it has increased rapidly due to the ageing population.[3,4] AF is associated with an increased risk of stroke,[5] heart failure,[6] myocardial infarction[7] and chronic kidney disease,[8] which increases the burden on healthcare systems around the world. Treatment of AF has become a huge challenge in the field of cardiovascular diseases.

Department of Critical Care Medicine, The First Affiliated Hospital of Xiamen University, Xiamen 361003, PR China
Jianhua Li, MD
Minwei Zhang, PhD

Department of Cardiology, Shandong Provincial Qianfoshan Hospital, Shandong University, Jinan 250014, PR China
Mei Gao, PhD
Donglu Liu, MD
Zhan Li, PhD
Juanjuan Du, PhD
Yinglong Hou, PhD, houyinglong2010@hotmail.com

Risk factors and upstream treatment of AF

Previous studies have confirmed that initiation and maintenance of AF result from atrial remodelling, including electrical and structural remodelling, atrial energy metabolic remodelling and autonomic neural remodelling,[9-11] which are associated with a variety of risk factors,[2,12] such as valvular diseases, hypertension, ischaemic heart diseases, heart failure, hyperthyroidism, lung diseases, diabetes, obstructive sleep apnoea syndrome and atrial fibrosis. In addition, obesity, smoking, alcohol abuse and negative emotions (anger, stress, impatience and anxiety) are also risk factors for AF. Potential reversible causes of AF should be identified and treated where possible. Identification, prevention and proper management of these risk factors could effectively reduce the incidence of AF.

Upstream therapy refers to the use of non-anti-arrhythmic drugs that target the mechanisms of AF to prevent or reduce the occurrence of AF.[13] Recent research has highlighted the beneficial effects of lifestyle and risk-factor management for AF as upstream therapy. Treatment with angiotensin converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (ARBs) will delay or even reverse atrial remodelling of individuals with hypertension or left ventricular dysfunction, resulting in a reduction in new-onset AF.[14] Patients with cardiac surgery will achieve clinical benefits from preventing the occurrence of AF by using statins.[15] Long-chain 3-polyunsaturated fatty acids (n-3 PUFA) are considered to be able to prevent AF because of their multiple effects on cardiac electrophysiology, such as membrane stabilisation in the myocardial cell, and antifibrotic, anti-inflammatory and antioxidant characteristics, which may influence the mechanisms involved in the initiation and maintenance of AF.[16]

Prevention or treatment of AF-related risk factors and upstream treatment can effectively reduce the prevalence of AF and hospital admissions of AF patients.

Drug therapy for AF

The three major drug treatment strategies for AF are rhythm control, rate control and prevention of stroke. A guiding principle of therapy is to eliminate reversible conditions, such as hyperthyroidism or alcohol consumption, before treatment.