

# Current Approaches to Antiarrhythmic Therapy in Heart Failure



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## KEYWORDS

- Congestive heart failure • Antiarrhythmics • Atrial fibrillation • Rhythm control
- Ventricular tachycardia • Electrical storm • ICD shocks

## KEY POINTS

- Atrial fibrillation (AF) is exceedingly common in patients with heart failure (HF), as they share common risk factors.
- Rate control is the cornerstone of treatment for AF in patients with HF; however, restoration of sinus rhythm should be considered when more than minimal symptoms are present.
- Although implantable cardioverter defibrillators (ICDs) protect against sudden cardiac arrest in patients with HF, many will present with ventricular tachycardia (VT) or ICD shocks.
- Antiarrhythmic drug therapy beyond beta-blocker therapy remains fundamental to the termination of acute VT and the prevention of ICD shocks.

## INTRODUCTION

Antiarrhythmic drug therapy is used for 3 major purposes in patients with congestive heart failure (HF): maintenance of sinus rhythm (SR) in those with atrial fibrillation (AF), acute treatment of ventricular tachycardia (VT), and prevention of implantable cardioverter defibrillator (ICD) shocks. Management of arrhythmias in patients with HF requires nuance on the part of the provider. The efficacy of antiarrhythmic drugs must be balanced against its potential side effects and alternate therapies. Nevertheless, antiarrhythmic drug therapy retains a significant role in the chronic management of patients with HF.

## SUPRAVENTRICULAR ARRHYTHMIA

Supraventricular tachycardia (SVT) is an arrhythmia that originates from the atria. The most common of

these is AF. Other SVTs include atrial flutter, atrioventricular nodal reentrant tachycardia (AVNRT), atrioventricular reentrant tachycardia (AVRT), and atrial tachycardia. Typical atrial flutter (AFL), AVNRT, and AVRT are best treated with catheter ablation due to its high success rate and low risk of complications.<sup>1</sup> However, AF, atypical atrial flutter, and certain forms of atrial tachycardia often are treated first with medical therapy in the form of an antiarrhythmic drug. This review focuses on AF, the most prevalent atrial arrhythmia, which often is treated with antiarrhythmic drug therapy.

## AF: EPIDEMIOLOGY AND PATHOPHYSIOLOGY

AF is the most common arrhythmia and is increasing in prevalence.<sup>2</sup> Current estimates are that AF affects 2.2 million people in the United States and it is projected that number will be approximately 15 million

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by 2050.<sup>3</sup> HF is one of the leading causes of death worldwide and its incidence is also increasing.<sup>4,5</sup> These companion epidemics have accelerated the need for management options for AF in this population.

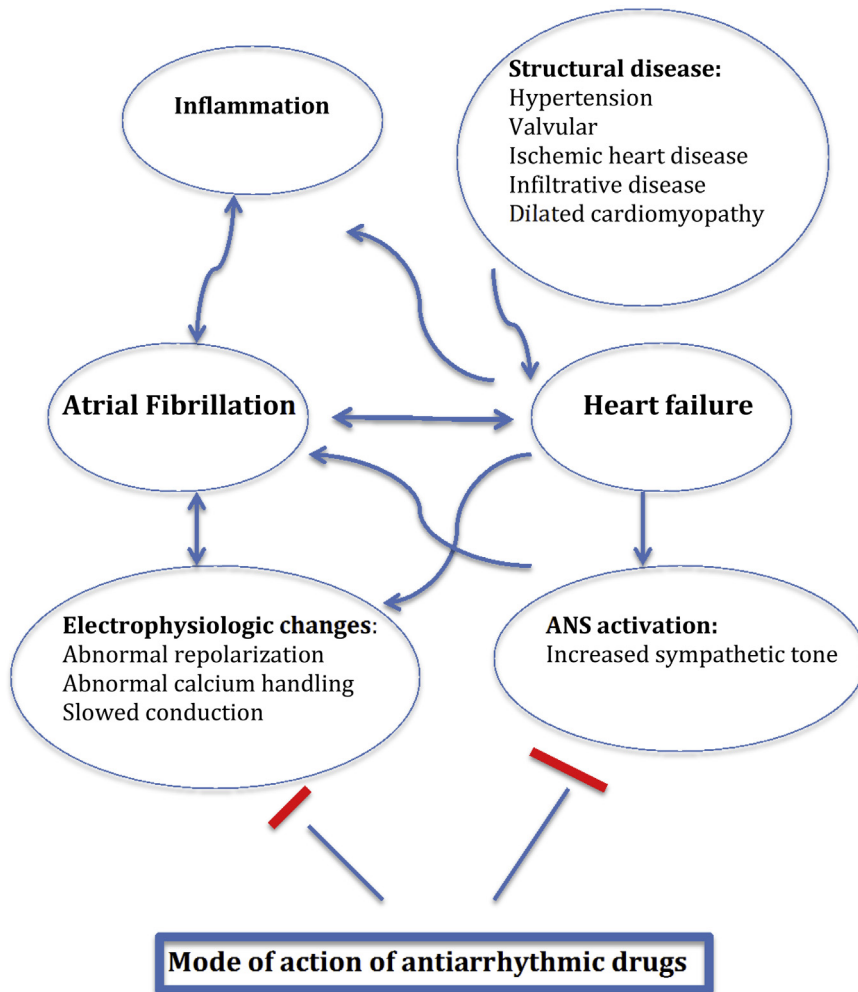
Chronic HF results in structural remodeling that creates an ideal substrate for atrial fibrillation. There is a complex interplay among ultrastructural, electrophysiologic, and neurohormonal changes that promote the coexistence of AF in HF (Fig. 1)<sup>6-9</sup>:

- Persistent left atrial hypertension from poor left ventricular (LV) chamber compliance and function promotes interstitial fibrosis and decreased gap junction surface area
- Structural myocyte changes lead to a reduction of repolarizing potassium currents and

consequently abnormal intracellular calcium handling

- A decline in electrical coupling between neighboring myocytes slows conduction within the myocardium
- Baseline pathophysiological activation of the sympathetic system
- HF medications may perturb electrolytes, which can influence further susceptibility to a proarrhythmic state

HF and AF share several risk factors, including coronary artery disease, diabetes mellitus, hypertension, obesity, and obstructive sleep apnea.<sup>10</sup> These contributing factors lead to a high prevalence of AF in HF, affecting 30% of all individuals with HF, including those with reduced or preserved ejection fraction.<sup>11,12</sup> In addition, there is



**Fig. 1.** There is a complex relationship between the multiple factors that promote the coexistence of AF in HF; antiarrhythmics can be used to target electrophysiologic changes and abnormal autonomic which promote AF. ANS, autonomic nervous system.

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