

Difficulties in the management of a patient with heart failure and atrial arrhythmia

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Abstract

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia in elderly patients and is frequently associated with heart failure. The management of drug-refractory AF with inadequate ventricular rate control remains challenging. We report the case of a 75-year-old woman with heart failure and highly symptomatic atrial fibrillation, initially paroxysmal and later persistent, refractory to multiple rhythm- and rate-control strategies. Amiodarone was initially required to control arrhythmic burden, while guideline-directed medical therapy was initiated for concomitant AF-related cardiac decompensation. Due to persistent symptoms and inadequate rate control, an ablate-and-pace strategy was pursued. The patient underwent atrioventricular node ablation followed by implantation of a dual-chamber pacemaker with conduction system pacing. After the procedure, ventricular rate stabilized at approximately 80 bpm, symptoms resolved completely, and sustained clinical improvement was observed. In this context, amiodarone and heart failure-specific therapy were discontinued, as both therapies were no longer clinically indicated. Ablate-and-pace therapy represents an effective and durable treatment option in selected patients with refractory atrial fibrillation and drug intolerance. Early consideration of this strategy may prevent prolonged exposure to antiarrhythmic drug toxicity and improve patient outcomes.

Keywords: atrial fibrillation, heart failure, atrioventricular node ablation, conduction system pacing, amiodarone

Introduction

Atrial fibrillation is the most common sustained cardiac arrhythmia in elderly patients and is frequently associated with heart failure. While rhythm- and rate-control strategies represent the cornerstone of AF management, pharmacological therapy may be insufficient in patients with drug-refractory AF and inadequate ventricular rate control. In such cases, atrioventricular node ablation combined with permanent pacing represents a valuable and definitive therapeutic option.

Case presentation

A 75-year-old woman without significant structural heart disease was diagnosed with recurrent episodes of atrial fibrillation in 2020. Initially paroxysmal, the arrhythmia progressed to persistent AF and became associated with severe symptoms, including palpitations and exertional dyspnea.

First-line antiarrhythmic therapy with beta-blockers and flecainide proved ineffective. Amiodarone was subsequently introduced and



achieved rhythm control. Transthoracic echocardiography demonstrated preserved left ventricular ejection fraction, mild mitral regurgitation (grade II), and mild tricuspid regurgitation, without significant structural abnormalities.

Despite preserved systolic function, recurrent episodes of poorly controlled AF led to the development of symptomatic heart failure. Guideline-directed medical therapy was initiated, including beta-blockers, renin-angiotensin system inhibition, mineralocorticoid receptor antagonists, and SGLT2 inhibitors. Rate control remained suboptimal despite treatment with metoprolol and digoxin, and repeated electrical cardioversion attempts were unsuccessful.

Given persistent symptoms and inadequate ventricular rate control, an ablate-and-pace strategy was proposed. The patient underwent atrioventricular node ablation, resulting in complete atrioventricular block, followed by implantation of a dual-chamber permanent pacemaker (DDDR mode, base rate 80 bpm) with ventricular lead positioned on the conduction system. Post-procedural electrocardiography demonstrated atrial fibrillation with stable ventricular pacing at 80 bpm. No procedural complications occurred.

Following the intervention, the patient experienced complete resolution of palpitations and dyspnea. At 3- and 6-month follow-up, heart rate remained stable at approximately 80 bpm, with sustained symptomatic and functional improvement. In this setting, amiodarone was discontinued, as rhythm or additional rate control therapy was no longer required. Specific medical therapy for heart failure with preserved ejection fraction was also subsequently stopped, as the underlying mechanism of heart failure was corrected following atrioventricular node ablation and permanent pacing, with no recurrence of heart failure symptoms.

Discussion

Management of atrial fibrillation in elderly patients remains challenging, particularly when associated with heart failure and inadequate ventricular rate control. Although rhythm- and rate-control strategies represent first-line therapy, a substantial proportion of patients develop refractory disease despite optimal pharmacological management [1, 2].

Amiodarone remains one of the most effective antiarrhythmic drugs for rhythm control in atrial fibrillation, especially in patients with persistent AF or structural heart disease [3]. However, in patients undergoing atrioventricular node ablation, maintenance of sinus rhythm is no longer required, as ventricular rate control becomes entirely dependent on permanent pacing. Several

studies have demonstrated that, following successful ablate-and-pace therapy, discontinuation of antiarrhythmic drugs is appropriate once stable ventricular rate control is achieved [4–6]. In the present case, amiodarone was initially used to reduce the arrhythmic burden but was discontinued after ventricular rate stabilized at approximately 80 bpm under permanent pacing, without recurrence of symptoms.

Heart failure in patients with atrial fibrillation is frequently driven by tachycardia-mediated mechanisms and loss of atrioventricular synchrony rather than intrinsic myocardial dysfunction [7, 8]. Correction of the arrhythmic substrate through atrioventricular node ablation has been shown to improve symptoms, functional capacity, and hemodynamic status in selected patients [9, 10]. In our patient, recurrent poorly controlled AF resulted in symptomatic heart failure despite preserved left ventricular ejection fraction, prompting initiation of heart failure-specific medical therapy.

Following atrioventricular node ablation and implantation of a dual-chamber pacemaker with conduction system pacing, sustained ventricular rate control and complete symptom resolution were achieved. As the underlying mechanism of heart failure was effectively corrected, continuation of heart failure-specific medical therapy was no longer considered clinically necessary. Emerging data suggest that, in carefully selected patients, de-escalation of heart failure therapy may be considered once the precipitating cause of cardiac dysfunction has been eliminated and long-term clinical stability is maintained [11, 12].

Atrioventricular node ablation combined with permanent pacing has consistently been shown to improve symptom burden, exercise tolerance, and quality of life in patients with refractory atrial fibrillation [13–15]. More recently, physiologic pacing techniques targeting the His-Purkinje conduction system have been associated with improved ventricular synchrony and preservation of left ventricular function compared with conventional right ventricular pacing [16–19]. These benefits may further contribute to sustained clinical improvement and reduce the long-term need for pharmacological therapies.

Management of atrial fibrillation in elderly patients is frequently limited by poor tolerance to antiarrhythmic drugs. Although amiodarone is effective for rhythm control, its long-term use in older patients is often constrained by extracardiac toxicity, including thyroid, pulmonary, hepatic, and neurological adverse effects. Moreover, large clinical trials have shown no survival benefit of rhythm-control strategies over rate control in elderly populations, while exposing patients to increased drug-related complications. Current guidelines therefore emphasize careful individualization of antiarrhythmic therapy and support

early consideration of non-pharmacological strategies when drug treatment is ineffective or poorly tolerated [20–23].

This case underscores the importance of considering ablate-and-pace therapy as a definitive treatment option in selected patients with refractory atrial fibrillation, particularly when heart failure is predominantly arrhythmia-mediated.

Conclusion

Ablate-and-pace therapy represents an effective and durable treatment option in patients with refractory atrial fibrillation and inadequate rate control. By providing stable ventricular pacing and correcting the underlying mechanism of AF-related heart failure, this strategy may allow discontinuation of previously required pharmacological therapies and lead to sustained clinical improvement.

Acknowledgments

Conflict of interest

The authors declare no conflict of interest.

Consent to participate

Informed consent was obtained from the patient.

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