ATRIAL FIBRILLATION

COMPLEX CASE STUDY

Appetite Suppressant-induced Propafenone Proarrhythmia

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ABSTRACT. *The class IC agents are among the cornerstones of atrial fibrillation antiarrhythmic treatment in patients without structural heart disease and rarely produce proarrhythmic effects when used in appropriate individuals. The case report below describes a patient with a history of paroxysmal atrial fibrillation maintained on propafenone who manifested a life-threatening proarrhythmic event shortly after initiating a weight loss program that included taking an over-the-counter appetite suppressant. This agent contained several substances with adrenergic effects and presumably facilitated atrioventricular (AV) nodal conduction, thus allowing atrial flutter with 1:1 AV conduction with resulting rapid ventricular rates to occur in the setting of class IC agent therapy. The patient received appropriate emergent care for the arrhythmia, but the event re-emphasizes the dangers of these readily available sympathomimetic agents utilized in weight loss programs.*

KEYWORDS. *Atrial fibrillation, atrial flutter, cardiac arrhythmia.*

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Introduction

Among the cornerstones of antiarrhythmic therapy in patients with atrial fibrillation are the class IC antiarrhythmic agents propafenone and flecainide.¹ When the appropriate patient without structural heart disease is selected for treatment, these agents are tolerated well with a very high safety profile and low proarrhythmic effects. In fact the post hoc analysis of the AFFIRM trial could not identify any instances of proarrhythmia in the 460 patients treated with either of these agents.² Despite their safety profile, both ventricular and supraventricular proarrhythmic events may occur.³ One such example occurs as a result of the basic electrophysiologic effects of these sodium channel blockers that result in slowing of cardiac conduction.⁴ In certain conditions, this effect may result in enough lengthening of the atrial cycle in patients manifesting atrial flutter that 1:1 atrioventricular (AV) conduction with ensuing rapid ventricular rates may occur. These agents also exhibit the phenomenon of use dependence

whereby their electrophysiologic effects increase with higher heart rates, and this may result in significant QRS widening when tachycardia is present.⁵ 1:1 atrial flutter may be dangerous and is particularly evident in patients with heightened adrenergic states when accelerated AV nodal conduction is present and in those not taking concomitant AV nodal blocking agents.⁶

The present report elucidates a patient in whom the proarrhythmic effects of propafenone were enhanced after ingestion of an over-the-counter diet supplement containing sympathomimetic ingredients and resulted in a life-threatening event.

Case presentation

A 53-year-old women presented to the emergency room with presyncope, palpitations, and a wide-complex tachycardia. The patient had a history of hypertension, obesity (body mass index, 62), and paroxysmal atrial fibrillation for the past year. Prior cardiac catheterization had demonstrated no obstructive coronary artery disease. For the past 4 months she had been maintained on propafenone (225 mg orally three times a day) in addition to rivaroxaban (20 mg orally every day) and

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furosemide (40 mg orally every day). Despite her current regimen, she had noted occasional palpitations that were at times prolonged, but generally self-limiting. One week prior to admission, she had decided to embark on a weight loss program that included taking the dietary supplement 360Shred (two capsules orally twice a day). Among the ingredients included in this diet aid were caffeine, green tea extract, and synephrine. On the day of presentation, she had taken her regular medications and this agent. Later that day she abruptly developed rapid palpitations that were more intense than usual; these symptoms quickly evolved into profound weakness and presyncope prompting a 911 call by the family. Upon arrival emergency medical services personnel noted hypotension and a rapid wide-complex tachycardia. Amiodarone was administered and cardioversion was performed once without effect. She remained weak, but conscious and after repeat cardioversion in the emergency room, sinus rhythm was achieved. Review of her presenting electrocardiograph (ECG) demonstrates a wide complex tachycardia with a cycle length of 310 ms (**Figure 1**). Although ventricular tachycardia is possible, the tracing most likely represents atrial flutter with 1:1 AV conduction with the bizarrely wide QRS complexes commonly seen in patients taking class IC agents who manifest this phenomenon. In addition, the follow-up tracing post conversion (**Figure 2**) does demonstrate sinus rhythm with low amplitude P waves, first-degree AV block, and some QRS prolongation with the QRS axis being similar to the presenting ECG suggesting a supraventricular origin. Follow-up tracing the next day (**Figure 3**) demonstrated sinus rhythm with improved P-wave amplitude and PR interval and QRS interval shortening. The patient remained stable throughout the hospitalization. Electrophysiologic study demonstrated no inducible supraventricular or ventricular arrhythmias, and therapy with amiodarone was initiated. There was some consideration given for performing cavotricuspid isthmus ablation to allow potential continued class IC therapy, but she had continued with episodic symptoms on this regimen prior to admission. At discharge, plans for sleep apnea evaluation were initiated in addition to a weight loss program, with consideration given for a

Figure 1: Twelve-lead electrocardiogram obtained shortly after arrival in the emergency room demonstrating wide-complex tachycardia with cycle length of 310 ms and markedly widened QRS complexes.

Figure 2: Twelve-lead electrocardiogram recorded after cardioversion demonstrating sinus rhythm with low amplitude P waves, first-degree atrioventricular block, and mild ventricular conduction disturbance.

future possible ablation procedure for both atrial flutter and fibrillation.

Discussion

Hazardous cardiovascular side effects in vulnerable patients are a well-known consequence of over-the-counter agents that contain compounds with sympathomimetic effects and include the development of severe hypertension, induction of myocardial infarction and cardiomyopathy, and facilitation of cardiac arrhythmias.^{7,8} In general, these agents contain adrenergic stimulants designed to “enhance energy” or suppress appetite as part of a weight loss program. Because of identified health risks, the stimulant ephedra was previously banned. Other similar agents including synephrine have been introduced, with presumed enhancement of effect when used in combination with caffeine, as in the agent used by our patient. This specific over-the-counter stimulant has been associated with multiple life-threatening cardiovascular hazards.⁹ The arrhythmogenic effects have included life-threatening rhythms of ventricular origin, particularly in vulnerable cardiac patients, and rapid examples of supraventricular origin similar to the presented case.¹⁰

The present report describes a unique effect whereby the supplement containing three different sympathomimetic agents facilitated a proarrhythmic response in a patient on propafenone. The described response observed with class IC agents, atrial flutter with 1:1 AV conduction, usually requires

Figure 3: Twelve-lead electrocardiogram recorded the day after admission demonstrating sinus rhythm with improved P-wave amplitude and improvement in conduction.

some lengthening of the flutter cycle length to allow 1:1 AV conduction and a concomitant sympathetic effect, most commonly exercise, to facilitate AV nodal conduction. In the described case, however, the proarrhythmic effect occurred at rest as the dietary supplement had facilitated AV nodal conduction such that 1:1 conduction occurred at a cycle length of 310 ms. When this rapid rate occurred, the class IC use-dependent mechanism (increasing the drug effect at higher rates) also resulted in significant conduction delay in the ventricles with severe QRS widening evident. These profound conduction effects were no longer evident once the rate was controlled and the rhythm converted.

The present report is another example highlighting the cardiovascular hazards associated with over-the-counter agents with adrenergic properties as life threatening, and, in this case, proarrhythmic effects, may be facilitated. Appropriate guidance and management of vulnerable patients is essential.

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