Case Report

A Man with Unexplained Cause of Rapid Regular Wide QRS Complex Tachycardia: An Unusual Case Report of Atrial Flutter

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Objective: To report an unusual case of atrial flutter with 1:1 atrioventricular (AV) conduction with unclear precipitating factors.

Case Report: A 67-year-old Thai male patient presented with diarrhea and palpitation. The electrocardiogram showed a rapid regular wide QRS complex tachycardia (WCT). The tachycardia was spontaneously slow down during saline infusion. The atrial flutter with 2:1 AV conduction was demonstrated. The diagnosis of regular WCT was atrial flutter with 1:1 AV conduction. The precipitating cause could not be identified. The catheter ablation was successfully performed under EnSite Precision Cardiac Mapping System. The atrial flutter was suddenly terminated during catheter ablation along cavotricuspid isthmus. The patient remained sinus rhythm after eight months.

Conclusion: The present case was an unusual case of atrial flutter with 1:1 AV conduction with unclear precipitating factors. Although some possible causes were demonstrated, clear precipitating causes in the present patient should be investigated in the future.

Keywords: Atrial flutter with 1:1 AV conduction, Catheter ablation, Regular wide QRS complex tachycardia, Supraventricular tachycardia, Ventricular tachycardia

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Atrial flutter is a common cardiac arrhythmia in clinical practice. About 10% of supraventricular tachycardia (SVT) present with atrial flutter[(1)]. Atrial flutter with some degree of atrioventricular (AV) block commonly occurs in clinical practice. However, there is uncommonly atrial flutter with 1:1 AV conduction in some situations such as types IA and IC sodium channel-blocking antiarrhythmic drugs, conditions increasing sympathetic stimulation such as exercise, induction of anesthesia, or thyrotoxicosis, or concomitant accessory pathway[(2,3)].

Lewis described the first electrocardiogram (ECG) in a patient with atrial flutter with 1:1 AV conduction in 1915[(4)] and several cases were published thereafter[(2,5)]. The authors reported an unusual case of atrial flutter with 1:1 AV conduction with unclear precipitating factors.

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Case Report

A 67-year-old Thai male patient was referred to the authors' hospital. He complained of diarrhea and palpitation. He had a history of hypercholesterolemia and unknown heart disease. The physical examination was unremarkable except rapid pulse rate with stable blood pressure. The ECG showed a regular wide QRS complex tachycardia (WCT) at a rate of 257 beats per minute with monophasic R wave pattern in V1 (Figure 1).

During saline infusion, the tachycardia was spontaneously slow down to a regular narrow QRS complex tachycardia with saw-tooth appearance compatible with typical atrial flutter with 2:1 AV conduction (Figure 2).

The differential diagnosis of regular WCT in the present patient were ventricular tachycardia (VT), SVT with aberrant conduction including atrial flutter with 1:1 AV conduction, SVT with preexcitation, pacemaker related tachycardia, and pseudo wide complex tachycardia. Routine laboratory studies including renal function and serum electrolytes were normal. He had no previous history of pacemaker implantation or ECG evidence of preexcitation

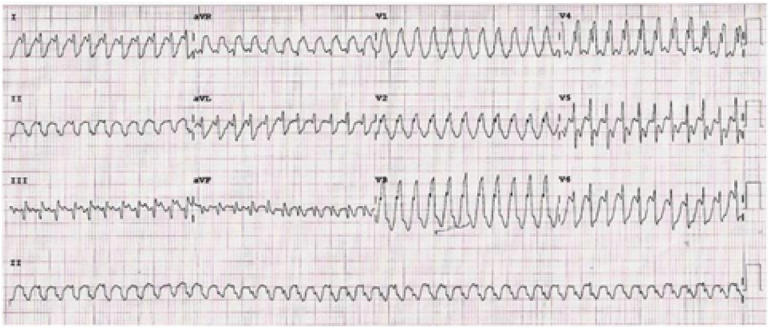

Figure 1. A regular wide QRS complex tachycardia.

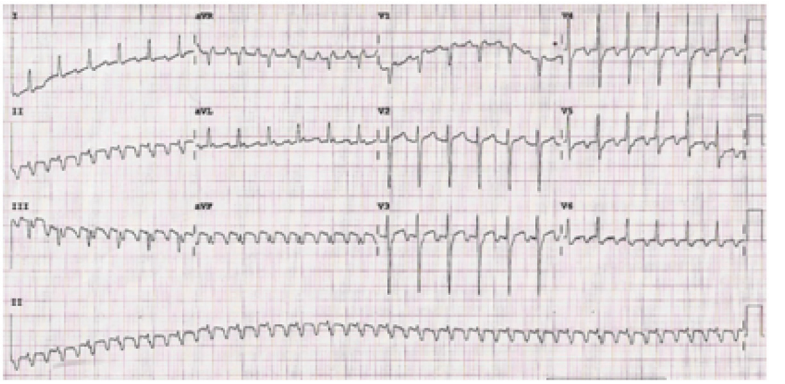

Figure 2. Atrial flutter with 2:1 AV conduction.

pattern. The echocardiogram showed good left ventricular contraction, mild aortic regurgitation and no left atrial (LA) dilatation with a LA volume index of 19 mL/m². Most possible cause of this tachycardia was atrial flutter with 1:1 AV conduction.

The intravenous amiodarone was administered, and oral metoprolol was initiated concomitant with parenteral enoxaparin followed by warfarin for stroke prevention. There was no recurrent WCT except paroxysmal atrial flutter with 2:1 AV conduction. The etiology of atrial flutter with 1:1 AV conduction is usually conditions causing slow rate of atrial flutter such as previous cardiac surgery, class IA or IC antiarrhythmic drugs, the presence of accessory pathway, and conditions increasing AV conduction such as some anesthetic drugs, or thyrotoxicosis[2,3].

He had no previous history of cardiac surgery or prior use of class IA or IC antiarrhythmic drugs. The thyroid function test was within normal range. The precipitating cause cannot be identified in the present patient.

He was scheduled for catheter ablation without warfarin interruption. He was recommended to discontinue oral metoprolol before hospital admission. Transesophageal echocardiography was performed before the procedure and showed no thrombus in left atrium and its appendage. Mapping with EnSite Precision Cardiac Mapping System showed the atrial flutter moved around tricuspid annulus counterclockwise.

The catheter ablation was successfully performed along the cavotricuspid isthmus. The atrial flutter suddenly terminated during catheter ablation (Figure 3). There was bidirectional block along the cavotricuspid isthmus. The patient remained sinus rhythm after eight months.

Discussion

The present patient was an unusual case report to demonstrate the atrial flutter with 1:1 AV conduction without clear etiologies. He presented with diarrhea during rapid tachycardia mimic VT. High vagal tone was expected in this situation, but all atrial flutter can unusually conduct through AV node without AV block. In general, the sympathetic tone predominately increases AV conduction, but the parasympathetic tone predominately (high vagal tone) should decrease

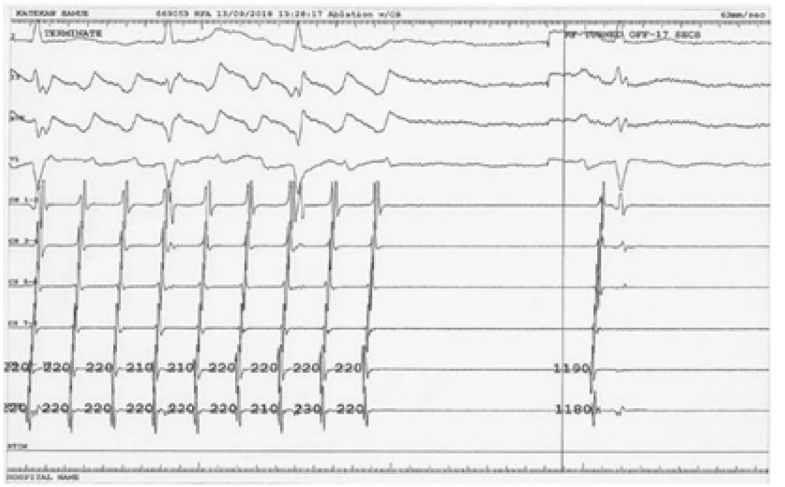

Figure 3. Atrial flutter was suddenly terminated during catheter ablation.

AV conduction[6]. The cause of atrial flutter with 1:1 AV conduction in the present case could not be identified. There may be two possible mechanisms in this situation. First, the elderly patient may have a slower rate of atrial flutter because of atrial electrical remodeling from age-related diastolic dysfunction despite having no LA dilatation, while AV conduction are intact leading to increasing conduction through AV node. However, an echocardiography cannot demonstrate a degree of diastolic dysfunction in the present patient due to atrial flutter during procedure. Finally, volume depletion after diarrhea and concomitant prolonged tachycardia may stimulate sympathetic tone and increase AV conduction leading to atrial flutter with 1:1 AV conduction. The last mechanism was confirmed from the patient that had no recurrent WCT except atrial flutter with 2:1 AV conduction after β-blocker administration.

Conclusion

The present case report is an unusual case of atrial flutter with 1:1 AV conduction with unclear precipitating factors. Although some possible causes were demonstrated, clear precipitating causes in the present patient should be investigated in the future.

What is already known on this topic?

The atrial flutter with 1:1 AV conduction is precipitated by types IA and IC sodium channel-blocking antiarrhythmic drugs, conditions increasing sympathetic stimulation such as exercise, induction of anesthesia or thyrotoxicosis, or concomitant accessory pathway.

What this study adds?

The atrial flutter with 1:1 AV conduction is induced with unclear precipitating causes. Possible mechanism may be related to atrial electrical remodeling from aging process or increase sympathetic tone during volume depletion.

Conflicts of interest

The authors declare that they had no conflicts of interest.

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