



## CASE REPORT

### Fascicular Left Ventricular Tachycardia Managed Medically with Diltiazem: A Case Report with Interpretation of Diagnostic Features

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#### Abstract

Idiopathic Fascicular Ventricular Tachycardia is a benign form of ventricular tachycardia that originates from left ventricle and usually do not cause hemodynamic compromise. It is particularly seen in young individuals without prior history of cardiovascular disease and can be managed medically in the most of cases. This arrhythmia can be confused with malign types of ventricular tachycardias and supraventricular tachycardias with aberrancy. In this paper we will present a case of fascicular ventricular tachycardia and interpretation of diagnostic features on electrocardiogram.

*Keywords: idiopathic fascicular VT, diltiazem*

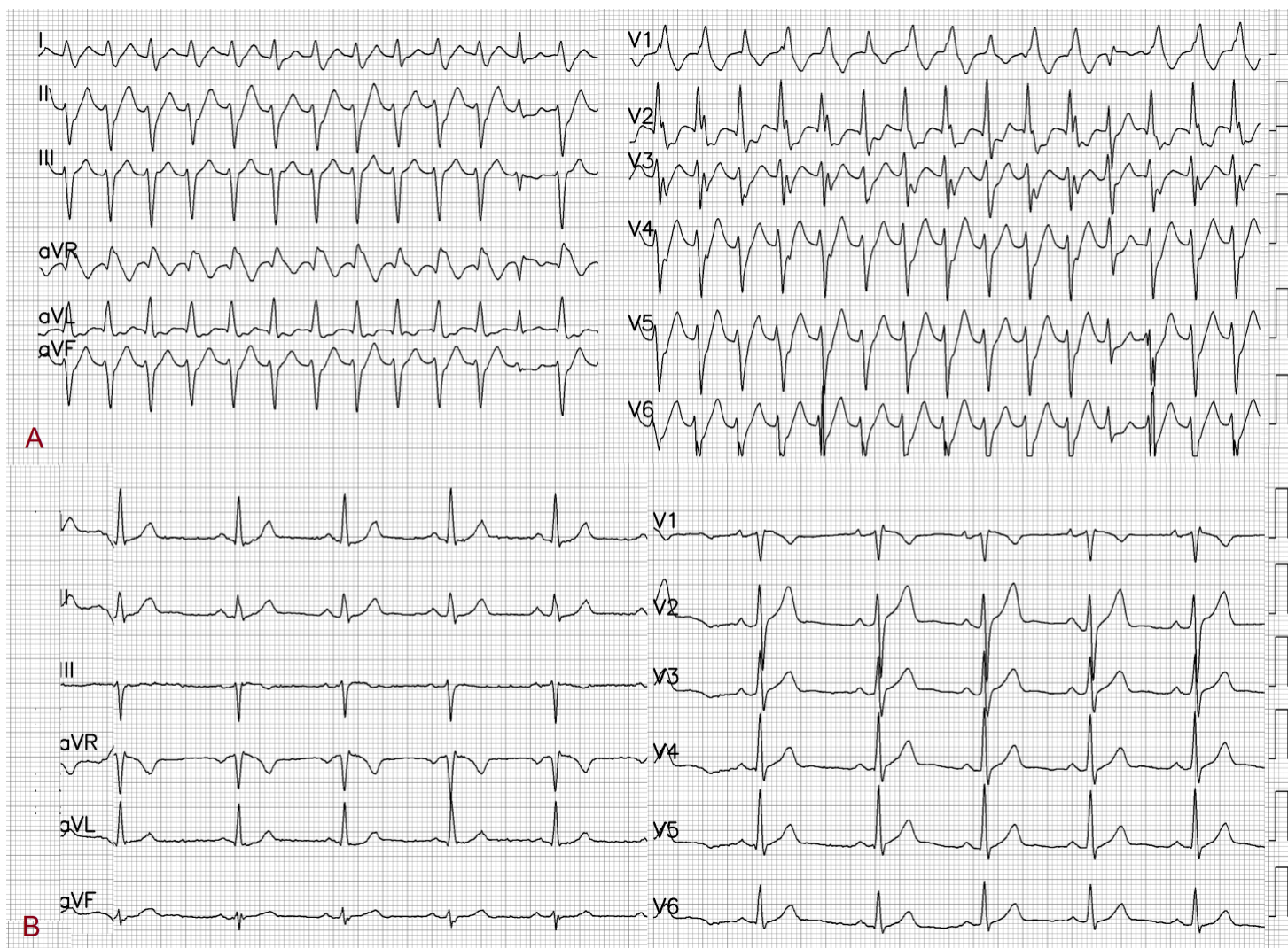
## Introduction

Idiopathic fascicular left ventricular tachycardia (IFVT), named verapamil-sensitive ventricular tachycardia as well, is patterned with right bundle branch block (RBBB) and left axis deviation with relatively narrow QRS interval (120–140 ms) in young individuals not having apparent cardiovascular disease. Even though verapamil was accepted a mainstay for slowing or terminating this arrhythmia, there is also evidence of other antiarrhythmic agents using for this aim. In this paper, we present a case of IFVT that was managed initially and long term with diltiazem.

## Case Report

A 42-year-old man without history of any chronic disease was brought by ambulance to the emergency department with preliminary diagnosis of ventricular tachycardia (VT). Patient had called the ambulance due to sudden onset of palpitations and lightheadedness which have started about 1 hour ago while he was working in his office. He was awake and denied syncope or chest pain. His blood pressure was 140/90 mmHg and pulse rate was 180/min and oxygen saturation was 98% on room air. The surface electrocardiogram (ECG) demonstrated QRS complexes with RBBB morphology at a rate of 180 bpm and left axis deviation of  $-70$  degrees (Figure 1). QRS duration was 130 ms and ventriculoatrial dissociation was present. There

was also capture and fusion beats to see on ECG. The patient was diagnosed with fascicular ventricular tachycardia and treatment with medical cardioversion was planned hence he was hemodynamically stable. Two rounds of 6mg and 12mg intravenous adenosine showed no effect on ECG. Since intravenous form of verapamil was not available in emergency room, using of another calcium channel blocker, diltiazem was decided. After administration of a single 10 mg dose of diltiazem through a peripheral intravenous access, termination of the wide complex tachycardia to normal sinus rhythm was noted approximately in 2 minutes with relief of his symptoms. His ECG showed normal PR and QT intervals and QRS duration of 100ms at a rate of 70 bpm after cardioversion. Chest radiography and transthoracic echocardiography revealed no abnormality. Laboratory parameters including inflammation biomarkers and serum electrolytes were in normal range. Alcohol or drug abuse was denied. He remained stable during his 3 hours of emergency ward stay and he was discharged with 90mg diltiazem tablet once a day. Holter electrocardiographic monitoring over 24 h did not identify any rhythm disorders and exercise ECG revealed no ST depression nor induced any arrhythmia. The patient was still symptom free and cessation of diltiazem was decided on 6th month of his follow-up. There was not any VT episode documented during his 3-year follow-up. Written informed consent was obtained from the patient.



**Figure.1:** (A) Twelve-lead surface ECG exhibiting a RBBB pattern with a left axis deviation and QRS interval of 130ms at a rate of 180 bpm. In addition to VA dissociation, typical features of IFVT like positive aVR, V6 R/S ratio  $\leq 1$  and QRS duration  $\leq 140$  ms can be seen on ECG. (B) After 10mg diltiazem given intravenously, conversion to normal sinus rhythm at a rate of 70 bpm was demonstrated.

## Discussion

IFVT is a cardiac arrhythmia that usually shows no hemodynamic disturbance and responding well to medical treatment. These arrhythmias were first described in the early 1970s and later it was found that these were sensitive to verapamil.<sup>1</sup> IFVT is mostly seen in young people without structural heart disease. It is usually paroxysmal, nevertheless, some case reports of incessant tachycardia causing heart failure and full recovery after medical therapy with verapamil only have been reported.<sup>2</sup> The mechanism

underlying this arrhythmia is mostly considered a calcium-dependent reentrant circuit close to the fascicles of the left bundle branch due to abnormal Purkinje fiber conduction.<sup>3</sup> Fast identification of this arrhythmia substantially in the emergency unit is valuable. These ventricular tachycardias could be confused with supraventricular tachycardias with aberrant RBBB and left anterior hemiblock. However, an attentive review of the surface ECG could show VA dissociation. Besides, QRS duration  $\leq 140$  ms, positive aVR, unusual V1 waveform (no rsR', or R larger than R') and V6 R/S

ratio  $\leq 1$  are important features that associating with the diagnosis of fascicular VT.<sup>4</sup> Verapamil is recommended as first choice drug for IFVT.<sup>5</sup> There is also data for safety and effectiveness of other agents such as ajmaline, lidocaine, propranolol, adenosine, tiapamil and diltiazem for slowing and terminating this rhythm.<sup>6-8</sup> Radiofrequency catheter ablation of late-diastolic Purkinje potentials during tachycardia is a proper treatment method for patients who have intense symptoms or resistance to medical therapy.<sup>9</sup> Arrhythmias in occasional and well-tolerated IFVT episodes may not show progression, even though no pharmacological therapy is provided.<sup>10</sup> Watchful long-term follow-up is still recommended until further data be released.

### Conclusion:

This case report emphasises importance of clinical presentation and surface ECG features on the diagnosis of fascicular VT and also the effectiveness of antiarrhythmic drugs other than verapamil on IFVT.

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