CLINICAL VIGNETTE

A Case of Idiopathic Fascicular Ventricular Tachycardia

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Background

Ventricular tachycardia (VT) is comprised of the group of arrhythmias resulting in abnormal ventricular activity occurring in patients with structurally normal and structurally abnormal hearts. There are multiple causes of VT, many of which may lead to sudden cardiac death (SCD). As a result, implantable cardiac defibrillator (ICD) placement is often considered in patients with VT to abort SCD. While ICD placement can be potentially life-saving it is often associated with significant morbidity including risk of infection and inappropriate shocks. However, Idiopathic Fascicular Ventricular Tachycardia (IFVT) is a well-known cause of VT that is sensitive to medication treatment and can be treated without ICD.

Case Presentation

A 47-year-old man with no significant previous medical history presented to the emergency department for evaluation of shortness of breath, diaphoresis and lightheadedness. The patient had completed a 3-mile walk and had started jogging when he suddenly developed the above symptoms, causing him to stop. He was able to walk home and rested for 45 minutes. When his symptoms did not abate he came to the emergency department for further evaluation. He denied chest pain or palpitations. The patient routinely followed a similar exercise routine without difficulty.

In the emergency department, he was found to have a wide-complex tachycardia with heart rate 190 bpm, a right bundle branch block pattern (RBBB) and left axis deviation (Figure 1). For treatment of possible supraventricular tachycardia (SVT), the patient received adenosine 6 mg IV followed by 12 mg IV without change in his heart rate. He subsequently was given digoxin without effect. Given persistent tachycardia, he underwent electrical cardioversion with return to normal sinus rhythm. His initial troponin I was negative, however, repeat troponin I increased to 0.96 ng/ml. Given the elevated troponin, the patient underwent CT coronary angiography with no evidence of coronary artery disease or coronary anomaly. To exclude structural heart disease in the setting of presumed ventricular tachycardia, the patient underwent cardiac MRI which demonstrated normal heart structure without evidence of myocardial delayed gadolinium enhancement. The patient was started on verapamil and subsequent stress test done while on treatment demonstrated no evidence of ventricular tachycardia.

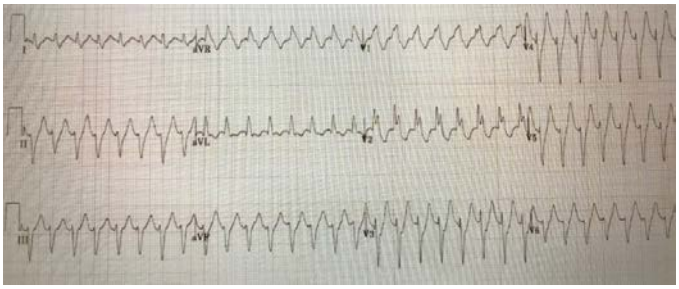

Figure 1. ECG demonstrating a wide complex tachycardia with QRS duration 124 ms, RBBB and left anterior fascicular block.

Discussion

Idiopathic Fascicular Ventricular Tachycardia (IFVT) is characterized by monomorphic tachycardia with RBBB pattern and a fascicular block pattern characterized by axis deviation. IFVT originates from the ventricular fascicles with conduction through the His-Purkinje system, producing a relatively narrow QRS compared to other forms of ventricular tachycardia. As in the patient described above, in posterior fascicular VT, there will be a RBBB pattern with left anterior fascicular block (left axis deviation). In patients with left anterior fascicular VT, the QRS will have a RBBB pattern with posterior fascicular block (right axis deviation). Sixty percent of patients have an upper septal fascicle and VT originating from this source may have a normal QRS or RBBB pattern. IFVT generally occurs in patients with a structurally normal heart, although structural abnormalities do not exclude the possibility of IFVT.[1] In a study of 33 patients, the mean age of onset was 27 +/- 16 years-of-age.[2]

It is important to distinguish IFVT from SVT with aberrancy. In this patient, the lack of response to adenosine is consistent with an arrhythmia that is independent of the AV node. AV dissociation also is indicative of ventricular tachycardia as opposed to SVT. VT arising from the mitral valve annulus or the papillary muscles may produce a similar morphology QRS morphology. Similar to IFVT, patients with RV outflow tract VT produce monomorphic VT with LBBB morphology, occurring in the structurally normal heart and carries a good prognosis.

IFVT is generally responsive to intravenous verapamil,[3] such that it has often been termed “Verapamil Responsive Ventricular Tachycardia.” IFVT is unresponsive to vagal maneuvers,

adenosine and digoxin. Furthermore, digoxin toxicity may trigger fascicular VT, requiring treatment with Digibind. The outcome of patients with IFVT with a structurally normal heart is good, with good long-term prognosis without use of ICD.[2] Treatment generally involves use of oral verapamil and beta-blockers while electrophysiology study (EPS) with catheter ablation can also be used in cases with refractory symptoms. After consultation with cardiology, this patient deferred EPS, citing his response to verapamil.

Conclusion

IFVT is an important cause of VT that requires identification so as to insure proper medication treatment. Given the good prognosis of this condition, patients with a structurally normal heart may be able to avoid ICD placement.

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