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Advanced cardiac imaging is helpful to determine the true etiology of outflow tract ventricular arrhythmias



Outflow tract (OT) ventricular arrhythmias have a distinct ECG pattern and hence can be easily identified via 12-lead ECG. In the presence of a normal echocardiogram, outflow tract arrhythmias have been considered to be benign and are often labeled as idiopathic. Yet ventricular arrhythmias, even in the presence of an apparently normal heart, may still be indicative of the presence of structural heart disease that might not be detected by standard imaging with echocardiography [1].

Cardiac sarcoidosis (CS) can affect the right ventricle and the basal interventricular septum, and in early stages may be associated with normal echocardiography. Bera et al. [3] correlated imaging findings in patients with OT PVCs and normal echocardiograms, and demonstrated that often ECG abnormalities were associated with the presence of cardiac sarcoidosis. This is not surprising, since in CS the inflammatory process often involves the basal septum including the conduction system, and this may be apparent on the 12-lead ECG during sinus rhythm. The authors demonstrate that the presence of a fascicular or a bundle branch block may indicate a disease process in the basal septum, and that QRS fragmentation and low voltage may indicate myocardial scarring. If present, these criteria should prompt further investigation with advanced cardiac imaging.

Without appropriate imaging, these patients might have been misclassified as having no structural heart disease, yet some of them might have had cardiac sarcoidosis, a condition that will require specific medical management in order to halt the disease progression. In the presence of a diagnosis of extracardiac sarcoidosis, an abnormal CMR finding may support the presence of CS [2]. CMR is not pathognomonic for sarcoidosis, however, and in the absence of extracardiac sarcoidosis, histology is required to make the diagnosis of CS. A subsequent cardiac PET study that is often combined with a whole body PET may confirm the presence of inflammation and indicate the presence of inflamed lymph nodes that could be targeted for biopsy.

An important caveat of this study, however, is that the described patients are not from a consecutive series of patients presenting with outflow tract arrhythmias, but were selected from 2 registries: patients with sarcoidosis and patients with OT arrhythmias with negative imaging findings. It is important to realize this fact in order to put the described results into perspective.

Furthermore, it is also important to realize that there are disease processes other than sarcoidosis that can be located in the basal septum and can impact on the QRS morphology and the conduction system. Lamin A/C cardiomyopathy among others can

predominantly affect the basal septum [4]; and often midmyocardial scarring is labeled as idiopathic since no clear etiology can be identified even after an exhaustive work-up.

There may be geographic differences with regard to the etiology of the abnormal imaging findings, and the prevalence of sarcoidosis may be higher in the study of Bera et al. compared to other reports. Lackireddy et al. reported sarcoidosis in only a minority of patients with frequent PVCs where PET studies were done [5]; the majority of patients were thought to have a limited form of idiopathic myocarditis [5].

The value of imaging to identify patients with occult structural heart disease cannot be over-emphasized. Awareness of the presence of scar is paramount, since depending on the scar size these patients may be at risk for sudden cardiac death [6], and programmed ventricular stimulation can be used for risk stratification even in the presence of preserved left ventricular function [7]. Myocardial scarring in patients with frequent PVCs without apparent structural heart disease is not uncommon and was described in about 25% of patients [6]. The first and most important step in management of these patients is to identify the scar with appropriate imaging.

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