



EDITORIAL

Ventricular pre-excitation using a 12-lead ECG: a challenging diagnosis

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Sudden cardiac death (SCD) in young adults is rare, but it is traumatic with cascading and deleterious effects on the family [1]. SCD has congenital and acquired causes, such as ion channelopathies, cardiomyopathies, structural congenital heart diseases, myocarditis and coronary abnormalities [1]. Children and adolescents with ventricular pre-excitation (VPE) are at increased risk of SCD [2]. The incidence of SCD in symptomatic patients with Wolf Parkinson White (WPW) syndrome is estimated to at 0.25% per year [3, 4]. It is therefore of utmost importance to recognize VPE.

In 1930, Dr Louis Wolff, Sir John Parkinson and Dr Paul Dudley White described a case series of 11 patients with an eponymous syndrome that now bears their names [3, 5]. However, diagnosing VPE remains challenging. A 12-lead electrocardiogram (ECG) can be a useful tool in diagnosis of VPE. Currently used criteria to diagnose VPE include a short PR interval, delta wave defined as slurring of the initial part of the QRS complex, and increased QRS duration [5, 6]. Diagnostic difficulties occur when suspicion for VPE is high but when the above criteria are not met. Bogun *et al.* [7] suggested that the absence of a septal Q wave in V6 could be a sign of pre-excitation.

In addition, in 2010 Eisenberger *et al.* retrospectively analysed multiple variables on pre- and post-ablation ECGs in 238 patients with manifest accessory pathways that had been successfully ablated, allowing them to devise a stepwise algorithm. It is proposed that if PR interval is ≤ 120 ms and PR dispersion,

defined as a difference between maximum and minimum PR intervals on a 12-lead ECG, is ≥ 20 ms, then further investigation is warranted. An absence of initial positive deflection (septal R wave) in lead aVR, and the presence of horizontal QRS transition in lead V1 will confirm pre-excitation [6]. Interestingly, they found that absent Q waves in lead V6 was not a good criterion for excluding pre-excitation in their cohort.

In this issue of the *Journal*, Aursulesei *et al.* [8] described a young patient presenting with recurrent episodes of supraventricular tachycardia. The ECG showed delta waves in leads V2 and V3 and increased PR dispersion of 40 ms, despite a normal QRS duration (100 ms) and PR interval (160 ms). Therefore, this patient did not meet the Eisenberger criteria for VPE. A subsequent electrophysiological study nevertheless confirmed the presence of a left accessory pathway. After successful ablation, PR dispersion was reduced to 5 ms. It should be stressed that although VPE is commonly associated with a shortened PR interval, this interval can be normal if the accessory pathway is far away from the sinoatrial node.

In summary, VPE is rare phenomenon and can be difficult to diagnose. However accurate diagnosis is crucial due to risk of SCD in young adults. This case demonstrates that the commonly used electrocardiographic criteria may not be adequate to confirm or exclude the diagnosis, vigilant clinical judgement and further investigations such as electrophysiological studies should be considered if there is a high suspicion of VPE.

Received: July 21, 2018. Accepted: August 19, 2018

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ACKNOWLEDGEMENTS

None.

CONFLICT OF INTEREST

None.

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