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'Left bundle branch block' in a structurally normal heart: not always due to left bundle branch block

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A 38-year-old woman not on regular medications presented with a history of intermittent palpitations. Her 12-lead electrocardiogram (ECG) (*Figure 1*) showed sinus rhythm with PR interval of 160 ms, QRS of 140 ms duration, and left bundle branch block (LBBB) pattern. An echocardiogram demonstrated a structurally normal heart. She underwent ambulatory ECG monitoring as her symptoms occurred frequently (*Figure 2*). The top panel shows two atrial premature beats (noted with asterisks) with narrow QRS complexes. The bottom panel shows narrow QRS complexes during sinus tachycardia. She underwent electrophysiological testing and was found to have an atriofascicular accessory pathway with normal His–Purkinje system (HPS) conduction. Atrioventricular nodal

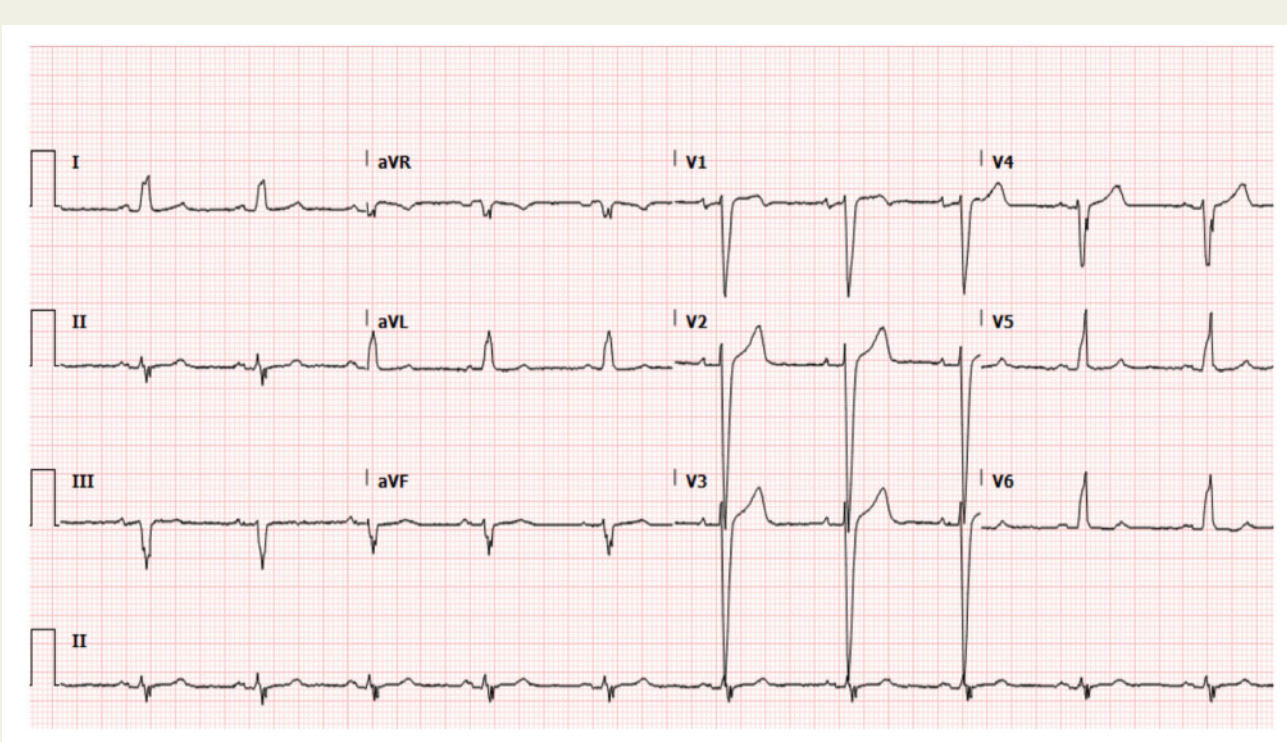

Figure 1 Baseline 12-lead ECG showing sinus rhythm with left bundle branch block morphology of QRS complex.

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Figure 2 Ambulatory ECG tracings showing: (1) top panel - two atrial premature beats (marked with asterisks) associated with narrow complex QRS; and (2) bottom panel - narrow QRS complexes during sinus tachycardia.

re-entrant tachycardia was induced during programmed electrical stimulation and slow pathway ablation was performed with no tachycardia inducible after ablation. The atriofascicular pathway was deemed safe (pathway anterograde effective refractory period 330 ms following a 600 ms drive-train), was not responsible for tachycardia, and therefore was not ablated. She was discharged without medications and was asymptomatic 7 months after her procedure.

This case illustrates that the presence of bundle branch block morphology of the QRS complex does not always represent conduction delay within the HPS. An atriofascicular pathway is an accessory pathway that typically connects the right atrium to the right bundle branch of the HPS.[1] These accessory pathways generally conduct slowly, giving rise to a normal PR interval. As the right bundle is activated first, the resulting QRS complex has a LBBB morphology due to late activation of the left ventricle. These pathways typically block at faster rates or in the presence of atrial premature beats, giving rise to narrow QRS complexes as activation of the ventricles proceeds via the HPS. This phenomenon would not be expected if the cause of LBBB is due to conduction delay or block in the HPS and is the clue that suggests an accessory pathway is involved.

It is important to be aware of accessory pathways as a potential cause for bundle branch block morphology on ECG as this has implications on further assessment and management. The normal HPS conduction and echocardiogram in this patient points away from a possible underlying myopathic process to an 'electrical' phenomenon with a benign prognosis.[2]

Consent: The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: Richard Ang is an associate editor for *European Heart Journal - Case Reports*.

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