CASE REPORT

Accelerated Idioventricular Rhythm Unmasking the Brugada Electrocardiographic Pattern

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It has recently been reported that a high-degree right bundle branch block (RBBB) may conceal the electrocardiographic manifestations of the Brugada ECG pattern. An 82-year-old with recent onset palpitations was seen in clinic. The resting ECG showed sinus rhythm, high-degree RBBB, and an irregular idioventricular rhythm. Some fusion beats between sinus rhythm and idioventricular rhythm occurred spontaneously depicting incomplete RBBB pattern and a clear cut elevation of the ST-segment was unveiled, giving rise to a suspicious Brugada ECG pattern. The mechanisms and implications of these findings are discussed.

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It has recently been reported that a high-degree right bundle branch block (RBBB) may conceal the electrocardiographic manifestations of the Brugada ECG pattern.^{1–3} On the other hand, the Brugada ECG pattern not only can be unveiled by spontaneous or provoked (i.e., by bradycardia-inducing maneuvers) intermittency of the conduction disturbance, but also by means of an electrophysiological stratagem designed to obtain nearly “normal” QRS complexes to avoid the effect of the secondary ST-segment changes of RBBB.¹ In fact, fused QRS complexes may be easily obtained by appropriately timed premature pacing of the right ventricle allowing to explore ventricular repolarization in the sinus (or atrial paced) beats without the influence of the RBBB.^{2,3}

We present a case of *spontaneous* unmasking of the Brugada ECG pattern in the context of baseline high degree RBBB.

CASE DESCRIPTION

An 82-year-old hypertensive male was seen in our Outpatient Clinic because of recent on-

set palpitations and dizziness. The resting ECG showed sinus rhythm at 55 beats/min, high-degree RBBB, and an irregular idioventricular rhythm whose left bundle branch block (LBBB) pattern with an electrical axis oriented to around –60 degrees, denoted right ventricular origin (Fig. 1). Electrocardiographic signs of left atrial and ventricular enlargement were also apparent and confirmed by transthoracic echocardiography. Furthermore, diverse fusion beats between sinus rhythm and idioventricular rhythm occurred spontaneously (Fig. 1, asterisks). In many fused QRS complexes showing an incomplete RBBB pattern, a clear cut elevation of the ST-segment was unveiled, giving rise to a Brugada ECG pattern in the right precordial leads, particularly in V₁ (Fig. 2, black arrows). Of note, in fused beats showing an incomplete LBBB pattern, the resulting repolarization changes did not resemble those of the Brugada ECG pattern (Fig. 1, asterisks; Fig. 2, white arrow). These observations were reproduced by appropriately timed ventricular pacing during an electrophysiologic study.

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Figure 1. Accelerated idioventricular rhythm unmasking the Brugada electrocardiographic pattern.

COMMENTS

High-degree intraventricular blocks cause characteristic secondary changes in ventricular repolarization. In fact, the secondary ST-segment level and the T-wave polarity are opposite to the delayed electrical forces of the QRS complex generated by the blocked bundle branch. Therefore, the presence of RBBB or LBBB may mask conditions provoking primary alterations of ventricular repolarization. Regarding complete or incomplete RBBB, a ST-segment elevation in the right precordial leads cannot possibly be expected. Furthermore, as recently described, the secondary repolarization changes in high-degree RBBB may obscure the ST-segment elevation typically found in the Brugada ECG pattern.¹⁻³

The case presented here shows an unusual combination of high-degree RBBB and an irregular rhythm originating from the right ventricle, with multiple fused beats giving rise to diverse QRS morphologies and corresponding changes in ventricular repolarization that is worth commenting.

First, the "pure" RBBB beats did not show a ST-segment descent in lead V₁ but exhibited a

slight elevation in leads V₂ and V₃, rising the suspicion of a Brugada ECG pattern concealed by the RBBB. Second, in fusion beats showing incomplete or minimal RBBB pattern, a clear cut elevation of the ST-segment was observed, giving rise to a Brugada ECG pattern, particularly in lead V₁. Lastly, fusion beats with an incomplete LBBB pattern showed ST-segment elevation in the right precordial leads but did not show the typical Brugada ECG pattern. This may be attributed to a secondary change of ventricular repolarization clearly seen in "pure" ventricular ectopic beats and should not be considered as evidence of concealed Brugada ECG pattern. This is of utmost importance for the interpretation of a recently proposed maneuver to unveil a suspected Brugada ECG pattern concealed by high-degree RBBB.¹⁻³ This consists of induction of fusion QRS complexes between right ventricular apical pacing programmed with a short atrioventricular interval with the impulse traveling along the His-Purkinje system. Although solid criteria to establish the diagnosis of Brugada pattern by means of this maneuver are still lacking, findings in this case strongly suggest that the behavior of the

Figure 2. Brugada ECG pattern in the right precordial leads.

ST-segment should be analyzed in fusion beats with a mild degree of RBBB (because the ST-segment elevation is opposite to the expected change even in an incomplete RBBB morphology) or in "normal" QRS complexes and not in those beats showing incomplete LBBB morphology in which the ST-segment elevation should be considered a secondary change to the conduction disturbance.

REFERENCES

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