A case of early repolarization syndrome presenting with sudden cardiac death due to dynamic change of J wave amplitude and ventricular fibrillation

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ABSTRACT

A 48-year-old man presented with sudden cardiac death due to ventricular fibrillation. After resuscitation, a 12-lead ECG showed dynamic change of the J wave amplitude. Coronary angiography and echocardiography showed no structural abnormality responsible for the development of ventricular fibrillation. These findings were compatible with early repolarization syndrome.

Key words: ■ early repolarization syndrome ■ idiopathic ventricular fibrillation ■ sudden cardiac death

Introduction

Recently, several studies documented a close association between idiopathic VF (VF) and the presence of early repolarization (ER) abnormalities in the inferolateral leads. Dynamic change in the J wave was frequently observed in patients with ER syndrome, especially close to the arrhythmic event. We report a case that presented with VF and temporal evolution of the J wave.

Case

A 48-year-old man presented to emergency medical service with sudden loss of consciousness. He did not have a history of any relevant medical illness. At emergency medical service arrival, the patient was pulseless and an automated external defibrillators (AED) recording obtained at the time of the event showed VF (Figure 1). After successful resuscitation by cardiac massage and a direct current (DC) shock delivered by the Automated external defibrillators, the patient was admitted to our hospital. The 12-lead ECG obtained in the ER showed no abnormal findings. However, a follow-up ECG revealed dynamic change in the J-point amplitude (figure 2). During observation in the intensive care unit, VF redeveloped subsequent to premature ven-
tricular contractions with a very short cycle length (figure 3). After receiving advanced cardiac support, the patient fully recovered without sequelae. Several examinations including 2D echocardiography and coronary angiography showed no abnormal findings, which enabled the exclusion of a secondary cause of VF. An ICD was implanted in the patient for the secondary prevention of sudden cardiac death (SCD) due to...
to idiopathic VF.

Discussion

SCD is defined as an unexpected death from a cardiac cause within a short period, generally ≤1 h from symptom onset. The majority of SCDs are associated with structural heart disease. Some individuals, however, have a vulnerability for the development of fatal arrhythmias caused by primary electrophysiological abnormalities such as long QT syndrome and Brugada syndrome.1-3

ER is a common electrocardiographic finding that is generally considered benign. However, the presence of this pattern, especially in the inferior or lateral leads, has recently been recognized in some studies to be associated with a vulnerability to VF.4-6 The prognostic value of ER is nevertheless not completely understood.

The ER pattern is characterized by J-point elevation manifested either as QRS slurring (at the transition from the QRS segment to the ST segment) or notching (a positive deflection inscribed on the terminal S wave), ST-segment elevation with upper concavity, and prominent T waves in at least 2 contiguous leads.

Dynamic change in the J wave is one of the most important characteristic ECG findings in patients with ER syndrome. Nam et al. investigated the initiation of VF episodes and reported a dramatic but very transient accentuation of J waves prior to the development of electrical storm.7 In many patients affected by ER syndrome, a spontaneous beat-to-beat fluctuation in the morphologic pattern of the ER was observed in addition to the spontaneous accentuation of the J wave amplitude preceding the electrical storm.

In the present case, the patient presented with SCD caused by VF. Coronary angiography and echocardiography did not show any structural abnormality responsible for the VF. ECG at HD1 showed typical ECG findings of ER syndrome, consisting of a slurred elevation of the J-point in the inferolateral lead. Furthermore, VF redeveloped at HD1. On the follow-up serial ECG, the amplitude of the J wave was decreased. This case therefore represents another example illustrating the association between a dynamic change in the J wave and the development of VF.

References

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