CASE REPORT

Brugada Syndrome Unmasked by Heat Exhaustion

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Brugada syndrome (BrS) as an established channelopathy can be unmasked by various triggers like drugs, fever, etc. Herein, we presented a female patient in whom type 1 Brugada pattern on admission electrocardiography might be unmasked by heat exhaustion.

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Brugada pattern; heat exhaustion; electrocardiogram

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A 48-year-old woman presented with malaise and dizziness that have been developed just after walking for 2 hours outdoor in sunlight (outdoor temperature: 41 °C). She did not experience confusion, seizure, presyncope, or syncope. Examination revealed body temperature of 38 °C, respiratory rate of 14/min, blood pressure of 90/50 mmHg, and pulse rate of 64 bpm. Other system examinations revealed no abnormality. Laboratory tests, chest x-ray, and urine analysis were in normal limits. On admission, ECG showed sinus rhythm (70 bpm) and Brugada type 2 electrocardiography (ECG) pattern in V₁₋₂ derivations (Fig. 1A). Transthoracic echocardiography was also normal. Medical history was unremarkable. Family history was negative for sudden cardiac death. She was diagnosed as having heat exhaustion, taken into a cooler room and hydrated with normal saline solution. She was fully recovered after 30 minutes of admission and discharged uneventfully. She has been referred to Cardiology clinic due to abnormalities in her ECG. She also introduced her previous ECG that was taken 1 year ago and showed sinus rhythm with incomplete right bundle branch block pattern in V₁₋₂ derivations (Fig. 1B). So, we thought that heat exhaustion might unmask the underlying Brugada syndrome (BrS). Therefore, we performed an ECG by shifting right precordial leads to second intercostal space that also unmasked a Brugada type 1 ECG

pattern in V₁₋₂ derivations (Fig. 1C). Furthermore, ajmaline drug challenge test was performed and also revealed a Brugada type 1 ECG pattern in V₁₋₂ derivations (Fig.1D). Thus, the patient was diagnosed as asymptomatic BrS that has been unmasked by heat exhaustion. Her family screening was negative due to the presence of Brugada type 1 ECG pattern. Due to the absence of symptomatology and family history, close clinical follow-up was planned and she was warned to avoid modulating factors like fever.

BrS is definitively diagnosed when a type 1 ST-segment elevation is observed either spontaneously or after provocative tests in at least one right precordial lead (V₁₋₂), which is placed in a standard or a superior position.¹ Besides its apparent ECG findings, it may also be unmasked by various modulating factors like fever.¹ However, the role of heat exhaustion as a cause of febrile state on Brugada-type ECG pattern was unclear.² But, probable mechanism shown to be due to the depolarization and repolarization abnormalities explained by temperature dependence on both of wild-type cardiac Na channels and mutated SCN5A cardiac sodium channels.³ Thus, we thought that typical Brugada pattern in our patient might be unmasked by febrile state due to heat exhaustion. Because of the absence of family history and symptomatology, we suggested her to avoid febrile states, vagal reactions, and drugs blocking sodium channels with close clinical follow-up.

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Figure 1. On admission electrocardiogram (ECG) showing normal sinus rhythm (70 bpm) with no ischemic or arrhythmic abnormality, but type 2 Brugada pattern (saddle back pattern) in V_{1-2} derivations (A). The previous ECG (1 year ago) showing sinus rhythm with incomplete right bundle branch block pattern in V_{1-2} derivations (B). ECG by shifting right precordial leads to second intercostal space revealed a type 1 Brugada pattern in V_{1-2} derivations (C). Ajmaline drug challenge test showing a type 1 Brugada pattern in V_{1-2} derivations (D).

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