

Brugada Electrocardiographic Pattern Unmasked by COVID-19 Induced Fever



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Coronavirus disease-2019 (COVID-19) is characterized by fever and inflammatory state, which may serve as provoking factor for Brugada pattern⁽¹⁾. Here, we reported a patient who developed a fever-induced type 1 Brugada electrocardiographic pattern appeared first after COVID-19 infection.

A 47-year-old male presented to the emergency room with the complaint of substernal chest pain. On admission, the patient was conscious with a 37.8°C fever, an 108 bpm heart rate and 135/75 mmHg blood pressure and normal respiratory findings (SaO₂ 95%). The electrocardiogram (ECG) showed a ST-segment elevation in the right precordial leads with no reciprocal changes (Figure 1). An echocardiogram demonstrated a mildly depressed global ejection fraction. Due to the persistence of substernal chest pain and ST-segment elevation, emergent coronary angiography (CAG) was performed, showing normal coronary arteries. After the diagnostic CAG, the patient was transferred to a dedicated COVID-19 intensive care unit. The patient had a 39.1°C fever. ECG was repeated and it revealed coved ST-segment elevation in lead V1 and V2 with a rise of the J-point by 0.25 mV indicative for Brugada type 1 ECG (Figure 2). He denied syncope, dizziness, or palpitations and there was no history of arrhythmic diseases in his family. Laboratory data were unremarkable. The high-sensitivity troponin level was within the normal range along with normal electrolytes. The N-terminal probrain natriuretic peptide (NT-proBNP) level was normal. The C-reactive protein (CRP) level was 40.2 mg/L (normal range: 0-5 mg/L). In order to investigate the cause of fever, the patient was tested for COVID-19 and chest computerized tomography (CT) scan was performed. Chest CT scan showed bilateral pulmonary parenchymal ground glass opacities of the lower lobes consistent with COVID-19 infection (Figure 3). Twenty-four hours after naso- and oropharyngeal swabs, the patient tested positive for COVID-19 by polymerase chain reaction (PCR). He received favipiravir, hydroxychloroquine and antipyretic therapy. No anti-arrhythmic treatment was initiated. With defervescence, the ECG demonstrated complete resolution of the initial Brugada-like ECG pattern (Figure 4). He was discharged from the hospital after the 7-day hospital stay when second PCR revealed a negative result. The patient had no prior history of ventricular arrhythmias or syncope and no family history of sudden cardiac death. Since the risk of sudden death in patients with asymptomatic Brugada pattern is low, defibrillator implantation was not done. Instead lifestyle modifications such as treating

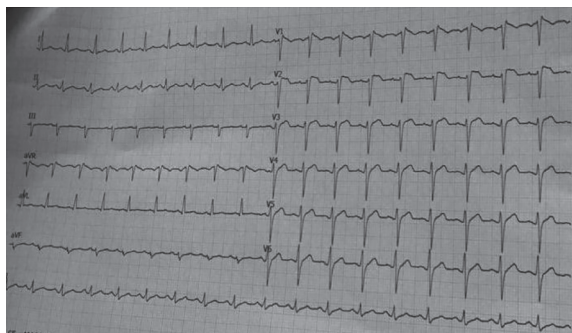


Figure 1. The patient's initial 12-lead electrocardiogram in the emergency room. ST-segment elevations in V1-V3 with the absence of reciprocal changes.

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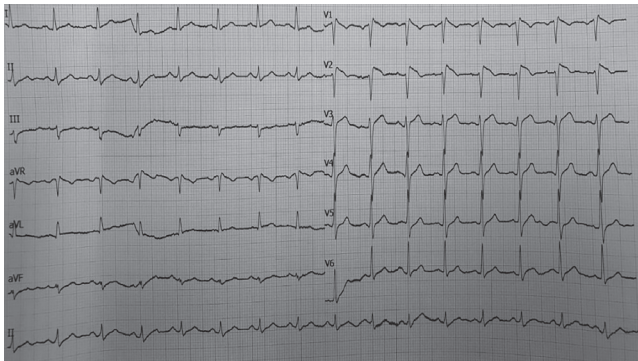


Figure 2. The patient's repeat 12-lead electrocardiogram shows elevation of the ST segment in V1-V2.

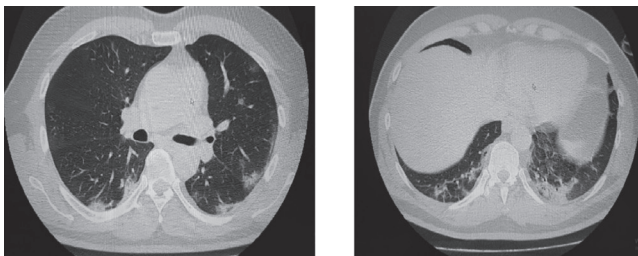


Figure 3. Chest CT scan shows bilateral pneumonia like ground glass and condensations.

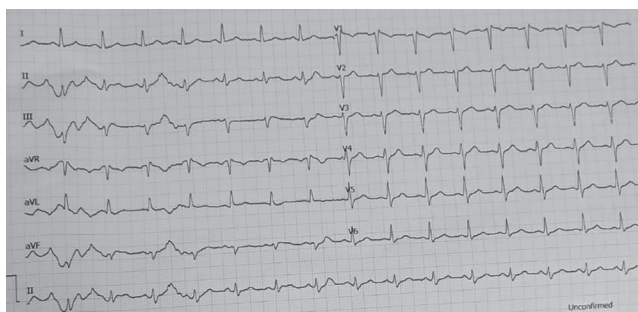


Figure 4. The repeat 12-lead electrocardiogram with resolution of fever.

fevers, avoiding alcohol and heavy meals were advised and consulting before using medications.

Coronavirus disease-2019 is an infectious disease that caused by severe acute respiratory syndrome coronavirus 2⁽²⁾. It usually causes upper respiratory tract infection or pneumonia. In the course of COVID-19 disease, various cardiovascular diseases such as acute coronary syndrome (ACS), myocarditis, pericarditis, deep vein thrombosis, acute pulmonary embolism, heart failure are observed⁽³⁾. A Brugada-like ECG pattern presents an additional diagnostic and therapeutic challenge because it may be seen in patients presenting with chest pain, thus mimicking ST-segment elevation⁽⁴⁾. Brugada-like ECG patterns have been previously described during fever, medications, alcohol^(4,5). However, these Brugada-like patterns usually disappear once the provoking event is removed. Herein, we reported a case of a COVID-19 induced fever revealing an unrecognized Brugada syndrome.

Drugs used in the treatment of the COVID-19 infection such as hydroxychloroquine, azithromycin cause fatal arrhythmias due to QT prolongation. Nevertheless, there is no documented contraindication to treatment with hydroxychloroquine in patients with Brugada syndrome. Although hydroxychloroquine was avoided due to possible increased risk of arrhythmia in the context of the initial reports of Brugada pattern in COVID-19 patients, there are reports use of hydroxychloroquine is safe in these patients^(1,6,7). Likewise, the presented case received hydroxychloroquine and no arrhythmias were observed.

In conclusion, the ongoing COVID-19 pandemic triggers many cardiovascular and arrhythmic events. In patients presenting with chest pain and ECG changes, ACS should be considered. However, it should be kept in mind that Brugada syndrome may present with ECG changes that mimic acute ST elevation myocardial infarction. These patients warrant aggressive antipyretic therapy and close monitoring until the fever subsides.

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