

CASE REPORT

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Co-Existence of Brugada Syndrome in Patient with Dilated Cardiomyopathy Due to Glue Sniffing

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ABSTRACT Volatile substance dependence is a common type of addiction among young people. These substances, which include adhesives, thinner, kerosene, cleaning products and perfumes, cause life-threatening clinical conditions. Glue sniffing is a form of addiction that is quite common in developing countries and has serious social and clinical consequences. Cardiac complications may be the cause of death. Brugada syndrome (BS) is a genetic cardiac disease characterized by sudden cardiac death and typical electrocardiography findings are important in diagnosis. The case presented because of the rare co-existence of BS and dilated cardiomyopathy due to chronic adhesive glue dependence in a 28-year old male.

Keywords: Glue sniffing; Brugada syndrome; dilated cardiomyopathy

Volatile substances can rapidly convert into gas form at room temperature. Especially in young people and children, volatile substance dependence is a common type of addiction in the world as it is cheap and very readily available.¹ Brugada syndrome (BS), a genetic disease, is generally characterized by sudden cardiac death at a young age. It is due to a mutation in the cardiac sodium channel genes.² Some clinical conditions such as drug use, hyperthyroidism, electrolyte disorders, and high fever may increase the incidence of arrhythmia in BS.³ As in the present case, volatile substance abuse may increase the incidence of arrhythmia. Early diagnosis and treatment are very important in such clinical situations.

CASE REPORT

A 28-year old male with Type I diabetes mellitus was admitted to the emergency service with syncope, and

electrolyte disturbance. On his physical examination, heart rate was 121 beats/min, blood pressure: 70/45 mmHg, respiratory rate: 8/min, orientation and cooperation was not possible, his Glasgow Coma Scale was 8. After intubation, the patient was transferred to the intensive care unit (ICU). A detailed medical history was taken from his relatives, and it was learned that the patient worked in a furniture store and had been sniffing bonding adhesive for a few years.

The patient was consulted with the neurology department because of blurred consciousness. In the urine analysis, there were no abnormal findings. The blood gas parameters in the emergency department were pH: 7.110, pCO₂: 19.4 mmHg, PO₂: 165 mmHg, HCO₃: 6.0, and BE: -21.5. Other laboratory parameters were glucose: 150 mg/dL, blood urea nitrogen: 41 mg/dL, creatinine: 1.9 mg/dL, aspartate transaminase: 248 U/L, alanine aminotransferase: 86

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U/L, potassium: 3.6 mmol/L, sodium: 156 mmol/L, calcium: 7.2 mg/dL, phosphorus: 7.1 mg/dL, magnesium: 1.8 mg/dL, and troponin: 0.5 ng/mL. The cranial tomography examination and blood ethanol levels of the patient were normal.

During hospitalization in the ICU, the electrolyte disturbance was corrected, and a bicarbonate infusion was started to treat metabolic acidosis. Diuretic therapy was started because of decreased urine output, but hemodialysis was not required.

On electrocardiography (ECG), there was a right bundle branch block and coved-type ST elevation consistent with Type 1 Brugada pattern in the V1-3 leads (Figure 1). BS was considered with all these findings. The patient underwent transthoracic echocardiography, on which the ejection fraction (with the Simpson method) was found to be 30%, left ventricular end diastolic and systolic diameters were 58-46 mm, left atrium diameter was 41 mm. The patient was diagnosed with systolic heart failure (low ejection fraction) and left ventricular enlargement. Based on the echocardiography and laboratory results, the patient was diagnosed with dilated cardiomyopathy (ischemic or non-ischemic) with cardiology consultation. Coronary angiography was planned for differential diagnosis due to impaired left

ventricular systolic dysfunction and increased cardiac enzyme (Troponin T).

However, cardiac arrest occurred after recurrent incessant ventricular tachycardia and ventricular fibrillation. Spontaneous circulation was achieved after effective cardiopulmonary resuscitation. Amiodarone treatment (150 mg intravenous bolus, 1 mg/min for 6 hours and 0.5 mg/min for 18 hours) and noradrenaline infusion (1.5 µg/kg/min) were started for hemodynamic stabilization, then an adrenalin infusion (0.5 µg/kg/min) was added to the treatment. For all these reasons, the coronary angiography could not be done. Consequently, despite all the treatments, the patient died twenty hours later. Informed consent was obtained from the patient's family for case publication.

DISCUSSION

Volatile substances are usually inhaled through the nose and mouth. Although substances such as cocaine, heroin and nicotine can be taken through the nose, they are not classified as volatile substances. However, volatile substances like solvent also can be rapidly addictive and cause withdrawal syndrome.⁴

Toxic effects generally occur due to metabolites.⁴ These substances are usually used for pleasure and the effects start and end relatively quickly. Al-

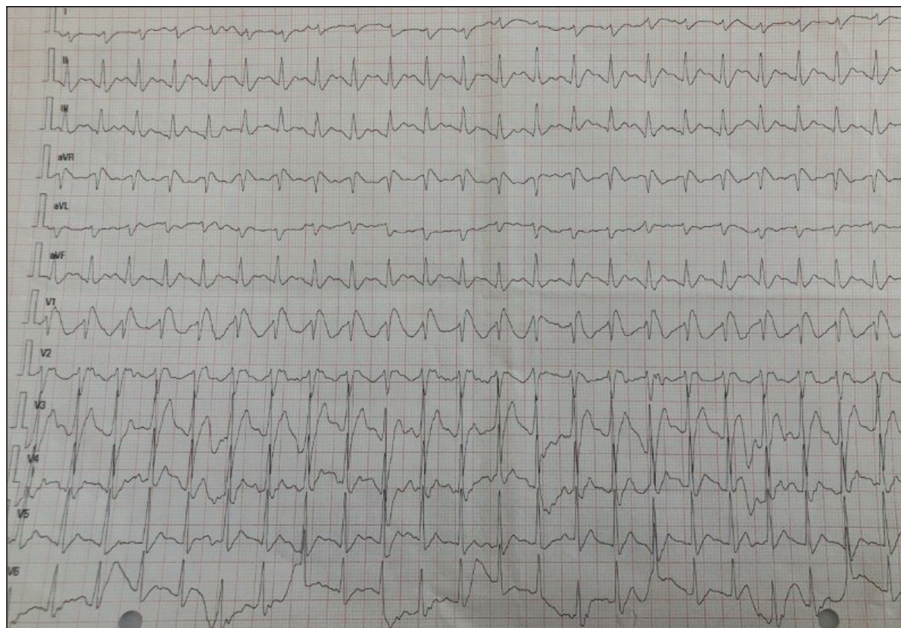


FIGURE 1: Patient's electrocardiography. Right bundle block and coved-type ST-elevation consistent with Type 1 Brugada pattern in the V1-3.

though laboratory parameters are not specific for this condition, substances such as toluene are rarely detected in the blood.^{4,5}

Especially in developing countries, glue sniffing is one of the most common types of volatile substance addiction, due to easy access and low cost. The effects on the central nervous system inhibitor neurotransmitters appear to be responsible for nervous system depression.^{4,6} The pleasurable effects such as euphoria, and feelings of dizziness or drunkenness increase addiction. Depending on the dose, speech disorder, diplopia, gait disturbance, delusions, visual hallucinations, seizures, loss of consciousness, coma and death may be encountered. Death may be due to aspiration when unconscious, asphyxia due to inhaling in to the respiratory system, respiratory arrest, and cardiac rhythm disorders.^{7,8} Although this is a very common addiction, there are only a few case reports in literature describing liver failure, renal failure, pancreatitis, hearing loss, polyneuropathy and cardiomyopathy due to metabolites.^{9,10} There are even fewer studies showing the cardiac effects of volatile substance abuse. In a study by Gustovsson et al., the frequency of heart attack was seen to be increased in cases exposed to volatile substances such as dynamite, exhaust gas, and solvents.¹¹ Patients with cardiomyopathy, and myocarditis due to chronic exposure have been presented in a limited number of reports.^{12,13} Similar to these cases, we suggest that dilated cardiomyopathy was due to glue sniffing since our case was young and had no known cardiac disease or cardiac complaints. But less likely, there may be an ischemic etiology or other causes of myocarditis.

As there is no specific treatment or antidote, symptomatic treatment is important. Depending on the severity of the clinical condition, treatment can be performed under intensive care conditions.⁴

BS was first described in 1992. Patients, especially male, usually suffer sudden cardiac arrest at a young age, caused by a mutation in the cardiac sodium channel genes.² The diagnosis is made from typical ECG findings, which are right bundle branch block, coved-type ST segment elevation and J point height in leads V1-V3 without cardiac ischemia, elec-

trolyte disorder, and heart disease. There are three types of ECG, and only Type 1 is diagnostic. In the current patient, since ECG Type 1 pattern was present, no further investigation was performed. Many causes, such as myocardial infarction, Chagas disease, right ventricular dysplasia, and some psychotropic agents may cause the ECG appearance to be similar to BS.^{2,14,15} There is no obvious treatment for BS. In patients with clinical findings such as syncope, arrhythmia and cardiac arrest as in the current patient, implantable cardioverter defibrillator still seems to be the most effective treatment to reduce the risk of sudden cardiac death. All family members should be informed about the BS and screened for the syndrome.¹⁴

The dilated cardiomyopathy due to glue sniffing is rare and may have an effect on the increased risk of mortality. In our case, we presented a patient who developed dilated cardiomyopathy due to glue sniffing. In addition, there was a coexistence of BS which caused ventricular arrhythmias and cardiac arrest. As a result, substance use should be investigated in young patients admitted to the ICU with the diagnosis of dilated cardiomyopathy and cardiac arrest, and BS should be kept in mind.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Pinar Karabacak; **Design:** Pinar Karabacak, Özlem Polat; **Control/Supervision:** Pinar Karabacak, Mustafa Karabacak; **Literature Review:** Pinar Karabacak, Özlem Polat; **Writing the Article:** Pinar Karabacak; **Critical Review:** Mustafa Karabacak.

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