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**CASE REPORT: BRUGADA-LIKE ECG PATTERN IN PATIENT AFTER SUCH AS  
LONG-TERM OUTCOME OF COVID-19**

Клиникалык жагдай: пациентте Бругадага окшош ЭКГ үлгүсү COVID-19дун узак  
мөөнөттүү татаалдыгы

Клинический случай: Бругада-подобная ЭКГ картина у пациента, как отдаленное  
осложнение COVID-19

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## CASE REPORT: BRUGADA-LIKE ECG PATTERN IN PATIENT AFTER SUCH AS LONG-TERM OUTCOME OF COVID-19

### Abstract

This article presents a clinical case of a patient who developed a Brugada-like electrocardiogram (ECG) pattern as a delayed complication after recovering from COVID-19. Brugada syndrome is a rare genetic disorder characterized by abnormal changes on the ECG and an increased risk of sudden cardiac death. Although the association between COVID-19 and cardiovascular complications is well-studied, the development of Brugada-like ECG changes in COVID-19 patients is a rare occurrence. This clinical case emphasizes the importance of early detection and appropriate management of cardiac complications in patients recovering from COVID-19, including the development of Brugada-like ECG changes. Consideration of these factors is crucial for optimal patient care and reducing the risk of sudden cardiac death.

**Keywords:** COVID-19, SARS-CoV-2, arrhythmia, Brugada syndrome, Brugada-like ECG pattern, implantable cardioverter-defibrillator.

**Клиникалык жагдай:** пациентте Бругадага окшош ЭКГ үлгүсү COVID-19дун узак мөөнөттүү татаалдыгы

### Аннотация

Бул макалада COVID-19дан айыккандан кийин Бругадага окшош электрокардиограмманы (ЭКГ) кеч татаалданган бейтаптын клиникалык окуясы берилген. Бругада синдрому ЭКГнын анормалдуу өзгөрүүлөрү жана жүрөктүн капыстан өлүм коркунучу менен мүнөздөлгөн сейрек кездешүүчү генетикалык оору. COVID-19 менен жүрөк-кан тамыр окуяларынын ортосундагы байланыш жакшы түшүнүлгөнү менен, COVID-19 менен ооруган бейтаптарда Бругадага окшош ЭКГ өзгөрүүлөрүнүн өнүгүшү сейрек кездешет. Бул окуя COVID-19дан айыгып жаткан пациенттерде жүрөк оорусун эрте аныктоонун жана адекваттуу башкаруунун маанилүүлүгүн, анын ичинде Бругадага окшош ЭКГ өзгөрүүлөрүнүн өнүгүшүн көрсөтөт. Бул факторлорду эсепке алуу пациентке оптималдуу кам көрүүнүн жана капыстан жүрөктүн өлүмүнүн коркунучун азайтуунун ачкычы болуп саналат.

**Клинический случай:** Бругада-подобная ЭКГ картина у пациента, как отдаленное осложнение COVID-19

### Аннотация

В данной статье представлен клинический случай пациента, у которого после выздоровления от COVID-19 развился Бругада-подобная картина электрокардиограммы (ЭКГ) в качестве отдаленного осложнения. Синдром Бругада представляет собой редкое генетическое заболевание, характеризующееся аномальными изменениями на ЭКГ и повышенным риском внезапной сердечной смерти. Несмотря на то, что связь между COVID-19 и сердечно-сосудистыми осложнениями хорошо изучена, развитие Бругада-подобных изменений на ЭКГ у пациентов с COVID-19 является редким явлением. Этот клинический случай подчеркивает важность раннего обнаружения и адекватного управления сердечными осложнениями у пациентов, выздоравливающих от COVID-19, включая развитие Бругада-подобных изменений на ЭКГ. Учет этих факторов является ключевым для оптимального ухода за пациентами и снижения риска внезапной сердечной смерти.

**Ачкыч сөздөр:** COVID-19, SARS-CoV-2, аритмия, Бругада синдрому, Бругада ЭКГ үлгүсү; имплантациялык кардиовертер дефибрилятор.

**Ключевые слова:** COVID-19, SARS-CoV-2, аритмия, синдром Бругада, картина ЭКГ типа Бругада; имплантируемый кардиовертер-дефибрилятор.

## Introduction

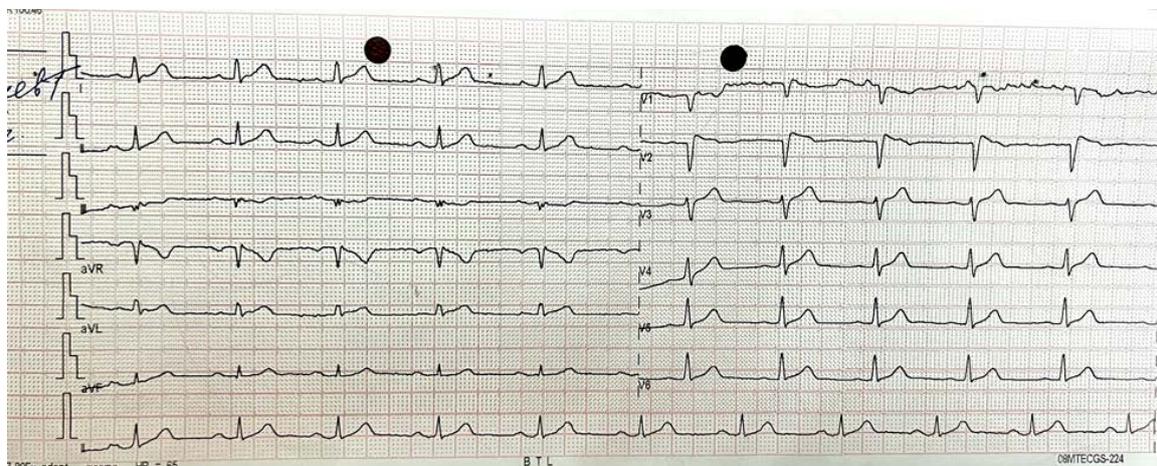
All countries have been challenged by the novel coronavirus, which one was recognized at the end of December 2019 in the city Hubei Province of China [1]. COVID-19 infection has quickly become widespread followed by a pandemic in 2020 [2]. Novel coronavirus predominantly affects the respiratory system, causing severe pneumonia and respiratory distress syndrome, also involvement of multiple organs and the cardiovascular system has been implicated [3,4]. Initial case reports from Wuhan, China, suggest that patients with established cardiovascular disease (CVD) may be at high risk of mortality [5]. Acute cardiovascular events in COVID-19 are acute myocardial injury, myocarditis, Takotsubo stress cardiomyopathy, acute coronary syndrome, arrhythmias and sudden cardiac death, venous thromboembolism and acute heart failure [6,7]. Supposedly, complication like an arrhythmogenic effect of COVID-19 can increase risk of cardiac arrhythmias. Due to events, symptomatic COVID-19 infection represents a risk factor for developing proarrhythmic complications for unmasking Brugada like ECG pattern [8].

The Brugada syndrome (BS) as a familial autosomal-dominant inherited arrhythmic disorder, was reported by Spanish cardiologists Josep and Pedro Brugada in 1992 [9,10,11]. Clinically BS is characterized by a life-threatening predisposition to syncope and cardiac arrest [12]. Electrocardiographic changes in BS include a special form of right bundle branch block (RBBB) with ST segment elevation in one or more right chest leads and absence of structural pathology of the heart, resulting in various life-treatening ventricular arrhythmias and increased risk of sudden cardiac death (SCD) [13]. Pathogenesis in BS is determined by genetic dysfunction of transmembrane ion channels- blocking the flow of sodium ions into cardiomyocytes [14].

In this article, we report case of young man with a Brugada-like ECG after sudden cardiac arrest who previously had a severe form of novel coronavirus disease.

## Case presentation

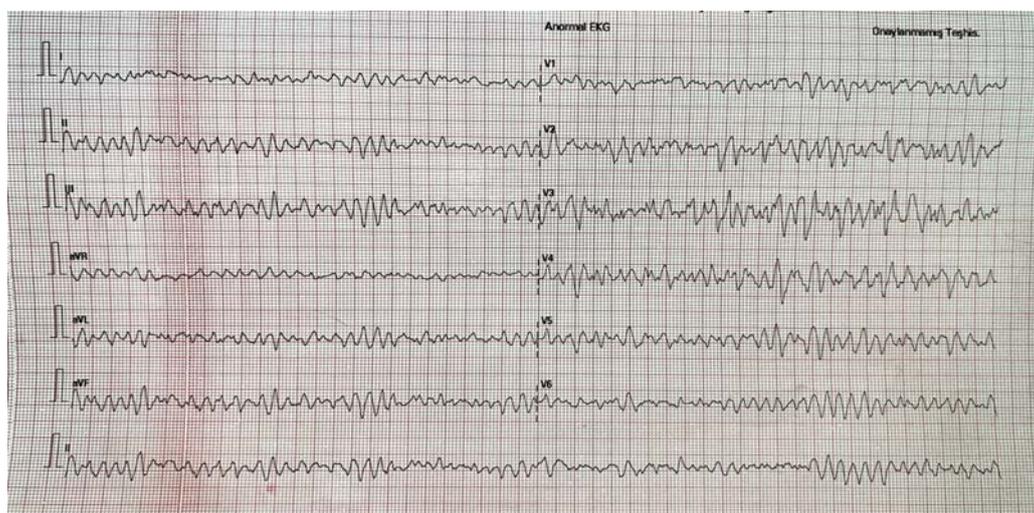
A 37-year-old Kyrgyz man presented himself to Medical Center Osh Cardio due to fatigue, palpitations, headaches and shortness of breath for two days. On his last month ECG (Pic.1) sinus rhythm with heart rate 65 per minute and right bundle branch block.



**Pic 1.** The 12-leads ECG a month ago.

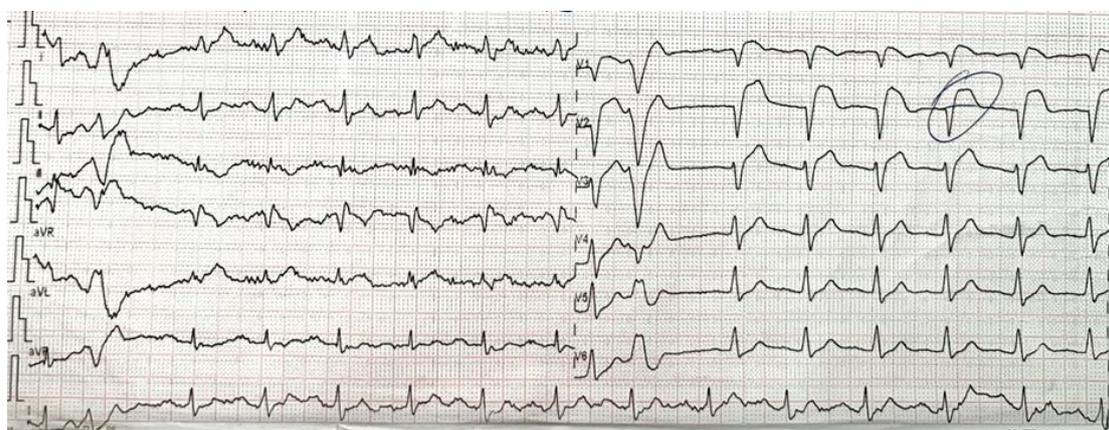
Patient admits that five month ago, three days after vaccination against COVID-19 (first dose of “Sputnik-V”) , he felt weakness, general fatigue and was discharged to hospital with

severe pneumonia. Serology tests for COVID-19 at the time of admission to our center revealed the positive results for IgG -17,0 g/l and it indicates that patient had covid 19 infection recent past. He was otherwise healthy and doesn't have comorbidities. He did not report any prior history of sudden death, arrhythmias, myocardial infarction or syncope in relatives. Rare extrasystoles during day showed on Holter ECG monitoring the day before admission. During the examination of patient, he suddenly lost consciousness. The patient was urgently transferred to emergency department, where ventricular fibrillation was registered on the cardiac monitor (Pic. 2).



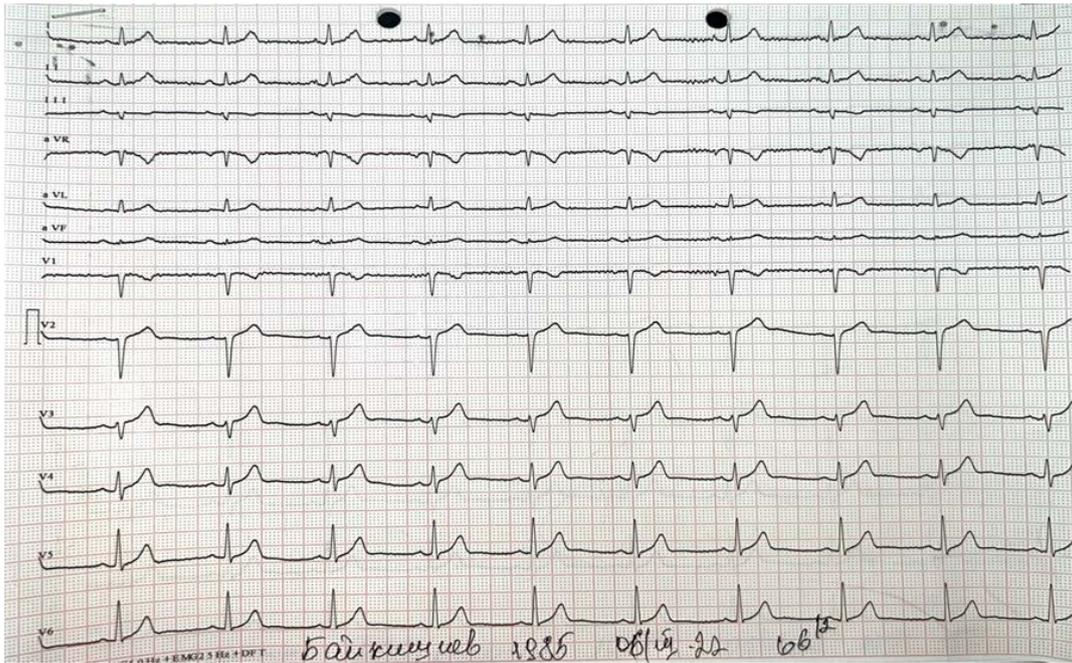
**Pic 2.** The 12-leads ECG in emergency department.

After first defibrillation with a current of 300J, sinus rhythm was restored on ECG, but showed ST-segment in V1, V2, V3 leads without reciprocal changes (Pic 3).



**Pic 3.** The 12-leads ECG after defibrillation with a current of 300J.

Laboratory investigation showed negative Troponin test. Transthoracic echocardiogram did not indicate any morphological abnormalities. The patient was taken for urgent coronary angiogram, which showed normal coronary arteries. After investigations as a prophylaxis measure, Implantable cardioverter defibrillator was implanted to the patient. On Fig. 4 demonstrates ECG after treatment, when it became unremarkable.



**Pic 4.** The 12-leads ECG - 13 days after.

## Discussion

This case demonstrated Brugada-like ECG pattern in patient as a long term complication of COVID-19, not associated with fever. Higher prevalence of arrhythmogenic episodes with cardiac complications in patients with severe COVID-19 was observed in several studies [15,16]. One article indicates that high fever is known to be a considerable risk factor for proarrhythmic complications and sudden cardiac death in patients with BS [17]. BS is more common in Asian male adults, often with aborted cardiac arrest and have less family history of SCD [18]. Clinical symptoms are associated with ventricular fibrillation, which in our case could lead to sudden heart arrest of the patient. BS has specific ECG patterns, often in young and healthy individuals who are unaware of their condition until syncope or sudden cardiac arrest and usually it occurs most frequently between the ages of 38 and 48 [19]. Undoubtedly, our patient's parameters match with this description.

In this report, Brugada-like ECG pattern can be diagnosed as a Long-Term Outcome of COVID-19, which is important implications for clinicians. COVID-19 infection may serve as a risk factor for the development of long-term proarrhythmic complications due to inflammatory stress caused by COVID-19 infection. The goals of this case report was to describe the relationship between virus-related issues such as arrhythmias in COVID-19 infection not only in acute phase of disease, but also as a long-term complication with a transient Brugada-like ECG pattern and its predisposition to proarrhythmogenic episodes.

## Conclusion

Case presentation with Brugada-like ECG pattern in patient as Long-Term Outcome of COVID-19 was not found and described before. We should be alert that COVID-19 can cause sudden cardiac arrest as a late complication. ECG should be done for all patients during COVID-19 illness, certainly after infection, and follow up by a cardiologist for at least one year.

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