

# Brugada Syndrome Causing Cardiac Arrest

Dr. Faras Husain A. A. AbuZeyad, MD, FRCPC, Emergency Medicine Consultant at Royal Clinics of the Custodian of the Two Holy Mosques, and King Fahad Medical City, Riyadh, Kingdom of Saudi Arabia

## ABSTRACT

This report discusses the case of a 29-year-old Bahraini male who suffered a cardiac arrest, from which he was successfully resuscitated in the Emergency Department. Subsequent electrocardiograms were consistent with Brugada Syndrome, showing the characteristic findings of ST-segment elevation in leads V1 to V3 and QRS morphology resembling a right bundle branch block. He was transferred to state Kuwait to have definitive electrophysiologic testing and an Implantable Cardioverter Defibrillator (ICD) inserted.

## INTRODUCTION

Brugada Syndrome is an arrhythmogenic disease with characteristic electrocardiogram (ECG) changes, consisting of ST segment elevation in V1 to V3, and right bundle branch block, causing ventricular tachyarrhythmias in patients with structurally normal hearts. The clinical manifestations of this syndrome are caused by episodes of polymorphic ventricular tachycardia or ventricular fibrillation, usually presenting clinically as brief syncopal attacks or cardiac arrest. Establishing the diagnosis of Brugada Syndrome is a challenge for the emer-

gency physician as these patients are often only diagnosed by the characteristic ECG changes after a successful resuscitation post cardiac arrest.

## CASE REPORT

A 29-year-old male suddenly collapsed at a mosque during prayer and was brought to the Emergency Department (ED) by local emergency medical services (EMS). The patient was intubated on the scene and CPR was started prior to transport by EMS.

The patient arrived in the ED around 12 to 15 minutes post collapse and was being ventilated and receiving chest compressions, but was otherwise apneic and pulseless. The initial cardiac monitor showed fine ventricular fibrillation and as such, the patient was defibrillated with 200 Joules, after which a sinus rhythm with a pulse was restored.

The ECG taken 2 minutes post-successful defibrillation showed sinus tachycardia with down-sloping ST-segment elevation in leads V1 to V3, and QRS morphology of a right bundle branch block (RBBB). Results of laboratory testing showed mildly elevated troponin I and creatine kinase (MB fraction). His complete blood count, serum electrolytes, serum glucose, and renal functions were all normal. Chest radiography and non contrast computed tomography of the head revealed no acute process. The patient remained hemodynamically stable in the ED. Cardiology consultation was obtained and the patient was admitted to the CCU. The following day the patient was extubated. The patient had an echocardiography and cardiac catheterization which were normal.

When questioned post-extubation, the patient described feeling breathless and light headed for several seconds prior his syncope attack. He had no past medical or surgical history, and was not on any prescribed or over-the-counter medications. There was no prior history of syncope or any family history of syncope or sudden cardiac death.

After complete evaluation by the cardiologist, the patient was transferred to the state of





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Kuwait to see an electrophysiologist. The diagnosis of Brugada Syndrome was confirmed. An Implantable Cardioverter Defibrillator (ICD) was inserted in the patient and family members were referred for cardiologic evaluation.

### DISCUSSION

Brugada Syndrome was first described as a distinct clinical entity by Pedro and Josep Brugada in 1992. The syndrome consists of syncope episodes and/or sudden cardiac death in patients with a structurally normal heart, and a characteristic ECG demonstrating ST-segment elevation in lead V1 to V3 and QRS morphology resembling a right bundle branch block (RBBB) appearance. The syndrome has gained wider recognition in recent years, with more cases being identified worldwide. It is believed to be responsible for 40–60% of all cases of idiopathic ventricular fibrillation and approximately 20% of deaths in patients with a structurally normal heart. It has been reported in a wide range of ages, with the peak around the fourth decade. The syndrome is far more frequently diagnosed in males especially those of southeast Asian descent. It has gained additional attention as a cause of sudden death in the otherwise healthy athletic population and has been one of the reasons experts have called for ECG's during the sports pre-participation examination.

While most cases of Brugada Syndrome are sporadic, there are familial cases. Familial Brugada Syndrome has an autosomal dominant mode of inheritance. While there are several different mutations identified in Brugada Syndrome, they all result in a reduction of the sodium current (loss of function) across the cardiac sodium channels. ST-segment elevation in the Brugada Syndrome is thought to be due to a rebalancing of the currents active at the end of phase 1, leading to an accentuation of the action potential notch in right ventricular epicardium, but not in the endocardium.

The manifestations of the syndrome are caused by episodes of polymorphic ventricular

tachycardia or ventricular fibrillation. When these dysrhythmias terminate spontaneously, the patient presents with syncope or palpitations. When the episodes persist, cardiac arrest and eventually sudden cardiac death occur.

Physicians should be aware that pharmacological treatment does not protect effectively against recurrent events and implantation of an ICD is still believed to be the only effective therapy to prevent sudden death. Mortality rate at 10-year follow-up is 0% for ICD, vs. 26% for pharmacological agents (amiodarone and  $\beta$ -Blockers). The Second Consensus Conference on Brugada Syndrome recommended that symptomatic patients receive an ICD.

### CONCLUSION

For any patient who presents to the Emergency Department with a history of palpitations, syncope or sudden cardiac arrest, or ECG that shows ST segment elevations in leads V1 to V3, the diagnosis of the Brugada

Syndrome should be entertained. Emergency Physicians should be aware of this syndrome and the characteristic ECG changes, as the ECG done in the ED in patients with the common complaints of palpitations or syncope may be the best opportunity to diagnose this condition in patients with an otherwise structurally normal heart. These patients need to be referred for definitive electrophysiologic testing and life saving management with insertion of an ICD. ■

The 6th Emergency Medical Services (EMS) congress is taking place from 26-28th October as part of the Abu Dhabi Medical Congress. Promoting multidisciplinary topics in Emergency Medical Services, this conference will offer the perfect opportunity for academic and scientific exchange. For more information, please visit [www.emergencycongress.com](http://www.emergencycongress.com) or call +971 4 3365161

