INNOVATIVE COLLECTIONS

COMPLEX CASE STUDY

Brugada Syndrome Unmasked by Tricyclic Antidepressant Overdose

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ABSTRACT. Brugada syndrome is an electrocardiogram (ECG) abnormality with a high incidence of sudden death in patients with structurally normal hearts. Brugada syndrome is due to a mutation in the cardiac sodium channel gene (sodium channelopathy). Over 60 different mutations have been described so far; at least 50% are spontaneous mutations, but familial clustering and autosomal dominant inheritance has been demonstrated. ECG changes can be transient with Brugada syndrome and can also be unmasked or augmented by multiple factors, including drugs such as calcium channel blockers, beta-blockers, alpha-agonists, sodium channel blockers, cholinergic stimulants, cocaine and alcohol. We hereby report a unique case of Brugada syndrome unmasked by tricyclic antidepressant.

KEYWORDS. Brugada syndrome, tricyclic antidepressant.

Case Report

A 25-year-old gentleman was brought to the emergency room after being found unconscious. The duration of unconsciousness was not known. Neither was there any information regarding past medical history. Initially the blood pressure was 90/55 mmHg, pulse was 70 bpm, and respiration was shallow. The arterial blood gas analysis showed severe metabolic acidosis. Endotracheal intubation was performed immediately. Urine and serum drug screens were negative. An electrocardiogram (ECG) (Figure 1) showed junctional complexes with retrograde P waves, complete right bundle branch block, prolonged QT interval, unusual ST segment elevation and T-wave inversion in V2–V3, and a prominent R wave in aVR. This clinical picture raised the suspicion of a toxic ingestion unmasking a Brugada-like ECG pattern; therefore, empiric gastric lavage and activated charcoal administration were performed immediately. He was started on intravenous sodium bicarbonate therapy, but despite these efforts the patient died. The terminal event was ventricular fibrillation resistant to defibrillation. The autopsy toxicology report showed elevated levels of amitriptyline. Hence it was concluded that the patient had unmasking of Brugada syndrome leading to ventricular fibrillation and death due to overdose of tricyclic antidepressant (TCA).

Discussion

TCAs are now utilized for the treatment of several other psychiatric conditions, including obsessive-compulsive disorder, attention-deficit disorder, and anxiety disorders, and medical problems, such as chronic pain syndromes, peripheral neuropathies, nocturnal enuresis, and migraine headaches. The cardiovascular effects of TCAs are predominantly due to dependent blockade of the cardiac sodium channel, which leads to prolongation of the QRS complex and QT interval. These ECG findings correlate with the TCA concentration and may be predictive of both seizures and dysrhythmias. There has been increasing awareness and diagnosis of Brugada syndrome recently. Medications that block sodium channels such as class IA or IC antiarrhythmic drugs are used to unmask the Brugada electrocardiographic pattern in order to confirm the diagnosis. However, TCAs also have the ability to block cardiac sodium...
channels, and a Brugada electrocardiographic pattern (BEP) can be unmasked by overdose. A Brugada-like ECG pattern after TCA ingestion is rare. In a study of 402 cases of TCA ingestion, only 2.3% developed BEP and none of the patients died. Very interestingly, our patient presented with incessant VF resistant to defibrillation preceded by BEP, and overdose of TCAs was found later during the autopsy. This highlights the importance of suspecting oral intoxication with sodium blocking drugs in an unconscious patient who presents with a BEP. Immediate measures should be taken in this situation, both to decrease absorption of the culprit drug and to prevent and overcome malignant arrhythmias.

**Conclusion**

Brugada syndrome is due to a genetic defect in the cardiac sodium channel and is the second leading cause of death in males less than 40 years (after trauma). ECG changes can be transient and sometimes unmasked or augmented by multiple factors, including drugs such as calcium channel blockers, beta-blockers, alpha-agonists, sodium channel blockers, cholinergic stimulants, cocaine, alcohol, or TCAs as seen in our case. Oral intoxication with sodium blocking drugs should be suspected in any unconscious patient who presents with a Brugada-like ECG pattern.

**References**


Figure 1: An electrocardiogram (ECG) shows junctional complexes with retrograde P waves, complete right bundle branch block, prolonged QT interval, unusual ST segment elevation and T-wave inversion in V2–V3, and a prominent R wave in aVR.