Case report

Atrial fibrillation in a WPW patient after the consumption of energy drinks: A case report.

Abstract:

This is a case of young male who developed fast atrial fibrillation after he consumed three cans of Energy drinks (EDs). Treatment requiring electrical cardioversion and surprisingly, when he reverted to sinus rhythm, the ECG showed a type A Wolff Parkinson White syndrome (WPW) (left-sided accessory pathway), which the patient did not know about before.

Key words: Energy drinks, atrial fibrillation, Wolff Parkinson White syndrome

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Introduction:

Energy drinks (EDs) are widely distributed among youth worldwide. EDs are marketed as boosters of increased concentration and physical capacity. They are highly caffeinated drinks and contain sugar in combination with amino acids such as taurine and herbal supplements that heighten the effects of caffeine (1, 2). Energy drinks are the fastest growing product in the beverage industry since bottled water, with a 240% increase in sales. (3, 4, 5)

Many reports of the adverse effects of ED intake have described a variety of symptoms and affected organ systems, including tachycardia, hypertension, confusion, agitation, seizures, liver damage, kidney failure and cardiac dysfunction, with potential deadly outcomes (6, 7).

A French official expert opinion statement published in 2013 concluded that a substantial proportion of the adverse effects were likely caused by EDs (8). The extent to which the negative consequences of ED usage are induced by caffeine, other ED elements, or a combination of the two is currently unknown; nevertheless, research suggests that the negative consequences of EDs may exceed the direct effects of caffeine alone. (9).

The most common adverse events of EDs affect the neurological and cardiovascular systems, according to a new comprehensive and systematic assessment of case studies related to EDs and their negative health repercussions. (4)

Goldfarb et al searched for case reports in peer-reviewed journals from January 1, 1980, to February 1, 2013, in which an acute CV event was temporally associated with ED consumption. They identified 17 cases of ED-related acute CV events (13 male cases; 15 cases aged <30 years, age range 13 to 58 years),; 10 of them had different cardiac arrhythmias; two had cardiac arrest; four cases had ST-segment elevations; and one had QT prolongation. (10)

Caffeine (1, 3, 7-trimethylxanthine) is a naturally found alkaloid. After ingestion, it is rapidly and completely absorbed from the gastrointestinal tract into the bloodstream and is readily distributed throughout the entire body. The most important mechanism of action of caffeine is the antagonism of adenosine receptors, which results in the release of norepinephrine, dopamine, and serotonin in the brain and an increase in circulating catecholamines. (11)

Case presentation:

In this case, we present a 23 year-old male who presented to the ER with palpitations and fatigue. He had no comorbidities before. However, he has a history of drinking 3 cans of energy drinks within a short time in between. On examination, his BP was 100/65, and his pulse was too fast and irregular. Other examinations were unremarkable. ECG showed fast AF with a heart rate > 200 b/m with a right bundle branch picture. (Fig 1)

Initially, we tried a bolus of amiodarone but had no effect on the rate, and blood pressure dropped. The patient was started on IV fluid, and prepared for electrical cardioversion. The patient consented, and was given anesthesia, and cardioversion was performed. Surprisingly, when he reverted to sinus rhythm, the ECG showed a type A WPW pattern (left-sided accessory pathway), which the patient did not know about before. (Fig 2)

Discussion:

Cardiac arrhythmias are reported as one of the common features of caffeine intoxication and EDS (12, 13), but in patients with Wolff–Parkinson–White syndrome, this is a serious condition. Wolff–Parkinson–White syndrome is an antegrade conduction that occurs over an accessory pathway. Atrial fibrillation (AF) is a common arrhythmia, but in the context of Wolff–Parkinson–White (WPW) syndrome, this is a medical emergency, as very rapid ventricular rates can develop due to bypass of normal rate-limiting effects of the atrioventricular (AV) node in the heart. This bypass may lead to ventricular fibrillation, which means cardiac arrest. (14, 15, 16, 17) In this case, although ventricular fibrillation did not occur, he was at risk.

In the literature, a narrative review assessing the effect of energy drinking on electrophysiology and ischemic abnormalities from 2001 to 2019 was published in 2021. The review described 28 published case reports; arrhythmia was described in 20 cases and only one case of WPW. (18) This case of WPW

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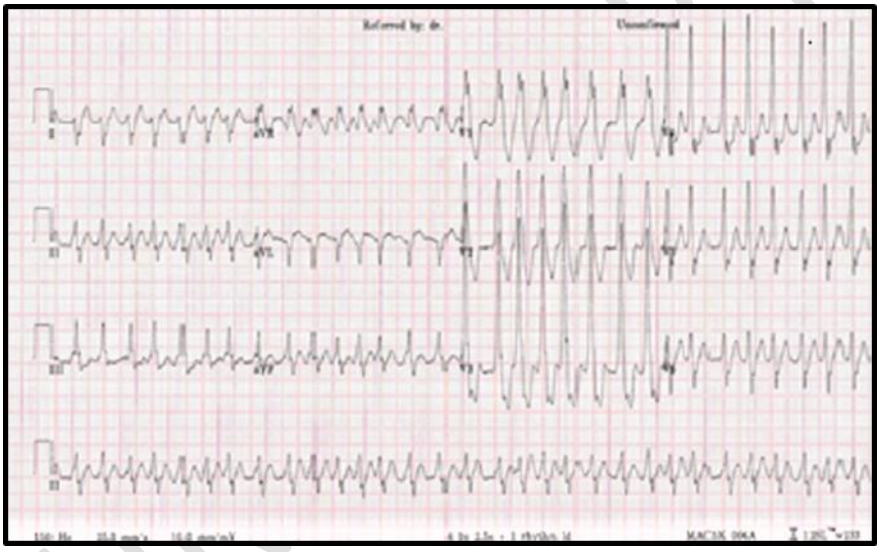
was a 34 year-old male who presented to the EDs with tachycardia and chest pain after consumption of an energy drink. The authors of the case concluded that consumption of EDs caused unstable angina and anhidrotic tachycardia. (19)

Earlier in 2014, another case was published in the BMJ case report, and it is very similar to our case. This case described a 17 year-old young male who developed wide complex tachycardia after EDs consumption, and after treatment, the ECG showed WPW (20) . To our knowledge, the current presenting case is a third published case describing the effect of ED in WPW patients.

Conclusion:

It has been proven that there is an association between the consumption of highly caffeinated drinks such as energy drinks and the development of cardiac arrhythmias, specifically atrial fibrillation. However, in Wolf Parkinsonian White syndrome patients, the condition is more serious.



(Fig 1) ECG: Fast AF with heart rate > 200 b/m with right bundle branch picture.

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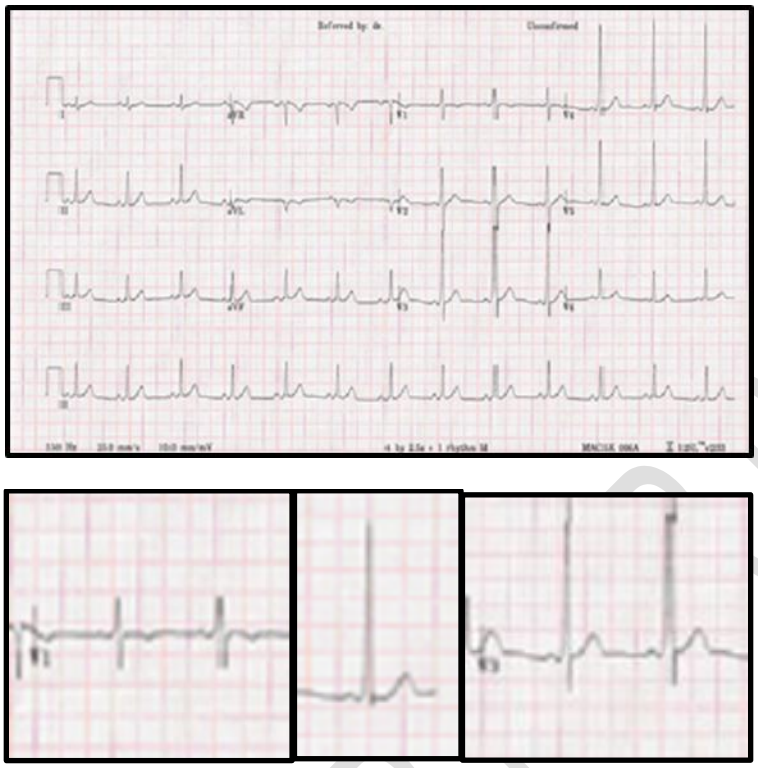

(Fig 2) ECG: Type A WPW pattern (left-sided accessory pathway)

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