Case Report

Ventricular Tachycardia Precipitated by the Use of the Diet Supplement *Hydroxycut Gummies*

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Abstract

Background: Dietary supplements have a long history of causing adverse effects. Ventricular arrhythmias have not been described with *Hydroxycut Gummies*.

Objective: To report a case of ventricular arrhythmia after prolonged use of a popular dietary supplement, *Hydroxycut Gummies*.

Case Report: An 18-year-old female with no significant past medical history presented with life-threatening ventricular arrhythmia following about 10 days of use of *Hydroxycut Gummies*, a legal dietary supplement previously unreported to cause this complication. The patient received external cardioversion due to progressive decline in mental status and persistent hypotension and was initiated on intravenous procainamide at an outside hospital. Left ventricular ejection fraction was 45% to 50%, and cardiac MRI showed no definite finding of infarct, myocarditis, or fibrosis. Beta-blocker therapy was initiated, and there was a progressive reduction in ventricular arrhythmia burden with an improvement of symptoms over the next few days. Two and a half months after the initial hospitalization, follow-up Holter monitor revealed occasional accelerated idioventricular rhythm events and a significant reduction in, but still occasional, long monomorphic ventricular tachycardia events. None of the ingredients listed in this product have been associated with cardiac dysrhythmias in the literature. One phytochemical potentially in the product is alpha-quinidine, which could be the cause of the adverse event. However, there was no other identifiable etiology for the ventricular tachycardia, which resolved after the discontinuation of supplement and the addition of beta-blocker therapy.

Conclusion: *Hydroxycut Gummies* should be considered a probable cause of this patient's arrhythmia given the lack of another etiology and a Naranjo Scale score of 6.

Key Words—dietary supplement, *Hydroxycut Gummies*, ventricular tachycardia

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The prevalence of obesity in the United States is increasing, affecting 35.7% of US adults in 2010.¹ The obesity epidemic has led to the increased use of widely available over-the-counter diet aids. As most herbal remedies are classified as dietary supplements, and thus not regulated as strictly by the US Food and Drug Administration (FDA), evidence of safety, efficacy, and quality is not required prior to marketing. Furthermore, these remedies often lack the rigorous quality and production standards that prescription medications have to adhere to. In part because of the lesser degree of regulation, herbal supplements are responsible for over 13,000 adverse events annually. Liver failure, colitis, and rhabdomyolysis are the most well-documented adverse events.^{2,3}

Since the withdrawal of ephedra-containing weight loss supplements from the market, newer formulations of supplements that are devoid of sympathomimetic amines have been developed. One of the primary components of *Hydroxycut* is epigallocatechin, the pharmacologically active component of green tea extract previously reported to potentially induce atrial fibrillation by inhibiting cardiac ion channels.⁴ Newer formulations of *Hydroxycut* claim not to contain epigallocatechin or caffeine as active ingredients.⁵ It is nevertheless possible that a sympathomimetic component of some type, potentially as an adulterant or a previously unreported effect of the listed ingredients, could lead to the development of ventricular arrhythmias.⁶ We report a case of ventricular tachycardia related to *Hydroxycut Gummies* (Muscle Tech).

CASE PRESENTATION

An 18-year-old White female Navy recruit with no prior medical history of cardiac or obstructive sleep disorders presented to the emergency department with a 1-week history of sustained palpitation, dyspnea, and fatigue. Prior to this event, she consistently exercised 3 to 5 times each week, running and performing weight-lifting exercises. She was not exercising when her symptoms developed. She weighed 75.7 kg, and had a body mass index of 28.63 kg/m². Upon presentation to an outside hospital, a 12-lead electrocardiogram (ECG) demonstrated irregular, rapid, wide-complex tachycardia, which initially was interpreted as atrial fibrillation with aberrant conduction. Several hours later, the patient required an external cardioversion due to progressive decline in mental status and persistent hypotension. She subsequently was initiated on intravenous procainamide and transferred to University of Florida Health Jacksonville for further care.

Upon arrival, the patient was noted again to be in irregular wide-complex tachycardia albeit at a slower rate. Closer examination of the ECGs revealed that the rhythm was actually ventricular in origin (evidence of atrioventricular dissociation and fusion beats). The patient provided a history of taking 2 *Hydroxycut Gummies* by mouth 3 times daily in accordance with labeled instructions for weight loss for about 10 days prior to the onset of symptoms but not taking prescription medications or other herbal or dietary supplements. She denied drinking coffee, soft drinks, green tea, or energy drinks. She denied illicit drug use, and a standard urine drug screen that included amphetamines, cocaine, and phencyclidine was negative. Serum electrolytes were within normal limits. There was no family history of arrhythmia or sudden cardiac death. Transthoracic echocardiogram demonstrated mild global systolic dysfunction with a left ventricular ejection fraction of 45% to 50%. Cardiac MRI that was performed several days later showed no definite finding of infarct, myocarditis, or fibrosis. Oral beta-blocker therapy was instituted. Over the course of the next several days, there was a progressive reduction in ventricular arrhythmia burden with an improvement of symptoms. The patient was seen at an outside hospital 1 month after discharge, and a repeat echocardiogram found a left ventricular ejection fraction of 60% to 65%. The patient returned to our clinic 2.5 months after discharge. The follow-up Holter monitor revealed occasional accelerated idioventricular rhythm events and a significant reduction in long, monomorphic ventricular tachycardia events with a heart rate in the range of 180-190 beats per minute. The patient reported that she was asymptomatic during these episodes and continued to exercise 3 to 5 times per week. She refused a formal electrophysiology study due to her current asymptomatic nature.

CASE DISCUSSION

The patient may have experienced chronic, asymptomatic ventricular tachycardia episodes; however, she did not endorse any cardiac or obstructive sleep disorder history. None of the product ingredients explicitly listed on the product packaging have been associated with cardiac dysrhythmias in the literature^{7,8} (Table 1). However, one phytochemical found in the leaves of *Olea europaea* is cinchonidine, which is also known as alpha-quinidine. Class I antiarrhythmics have been known to demonstrate proarrhythmic properties.⁹ The manufacturer does not describe the extract procedure or phytochemical

Table 1. Label contents of *Hydroxycut Gummies*

Calcium 50 mg
Pro Clinical Hydroxycut® Gummies™ Blend 160 mg
Hydroxyprovia™
Lady's mantle extract (as <i>Alchemilla vulgaris</i>) (leaf)
Olive extract (as <i>Olea europaea</i>) (leaf)
Cumin extract (as <i>Cuminum cyminum</i>) (seed)
Wild mint extract (as <i>Mentha longifolia</i>) (leaf)
Hydroxagen®
Goji extract (as <i>Lycium barbarum</i>) (fruit)
Acerola concentrate (as <i>Malpighia glabra</i>) (fruit)
Blueberry (as <i>Vaccinium corymbosum</i>) (fruit)
Pomegranate (as <i>Punica granatum</i>) (fruit)
Bilberry extract (as <i>Vaccinium myrtillus</i>) (fruit)

composition of the extract, which means the amount of cinchonidine, if any, in the products is unknown.^{5,10} However, there was no other identifiable etiology for her ventricular tachycardia, which was significantly reduced after the discontinuation of the supplement and the addition of beta-blocker therapy. Given the lack of another etiology and a Naranjo Scale score of 6 (Table 2), *Hydroxycut Gummies* is a probable cause of this patient's arrhythmia.¹¹

CONCLUSION

This is the first case report that establishes a probable association between the onset of ventricular tachycardia and use of *Hydroxycut Gummies*. Pharmacists should continue to scrutinize dietary supplements critically as potential causes of adverse events and utilize every resource at their disposal to provide their most educated assessments of these events when they occur.

Table 2. Naranjo algorithm for adverse drug events

Assessment	Score
1. Are there previous conclusive reports on this reaction? <i>No previous clinical case reports.</i>	Yes (+1); No (0); Do not know or not done (0) → 0
2. Did the adverse event appear after the suspected drug was given? <i>Event reported approximately 10 days after initiating Hydroxycut® Gummies™.</i>	Yes (+2); No (-1); Do not know or not done (0) → +2
3. Did the adverse reaction improve when the drug was discontinued or a specific antagonist was given? <i>Reduction in ventricular tachycardia burden after discontinuation of supplement.</i>	Yes (+1); No (0); Do not know or not done (0) → +1
4. Did the adverse reaction appear when the drug was readministered? <i>Not attempted.</i>	Yes (+2); No (-2); Do not know or not done (0) → 0
5. Are there alternative causes that could have caused the reaction? <i>Other alternative causes ruled out.</i>	Yes (-1); No (+2); Do not know or not done (0) → +2
6. Did the reaction reappear when a placebo was given? <i>Not attempted.</i>	Yes (-1) No (+1) Do not know or not done (0) → 0
7. Was the drug detected in any body fluid in toxic concentrations? <i>Not attempted.</i>	Yes (+1); No (0); Do not know or not done (0) → 0
8. Was the reaction more severe when the dose was increased, or less severe when the dose was decreased? <i>Medication was discontinued, and the patient did not adjust the dose.</i>	Yes (+1); No (0); Do not know or not done (0) → 0
9. Did the patient have a similar reaction to the same or similar drugs in any previous exposure? <i>No, first exposure.</i>	Yes (+1); No (0); Do not know or not done (0) → 0
10. Was the adverse event confirmed by any objective evidence? <i>Patient presented with electrocardiogram consistent with ventricular tachycardia.</i>	Yes (+1); No (0); Do not know or not done (0) → +1
Total score	6 → probable adverse drug reaction (ADR)

Note: Naranjo scale: ≥9 = definite ADR; 5-8 = probable ADR; 1-4 = possible ADR; 0 = doubtful ADR.

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