

Hypokalemia Induced Cardiac Arrest: An Unknown Complication of Cider Vinegar: Case Report

Hipokaleminin Tetiklediği Kardiyak Arrest: Elma Sirkesinin Bilinmeyen Bir Komplikasyonu

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ABSTRACT Sudden death also known as sudden arrest is an important major health problem worldwide. Unfortunately, the prognosis of out-of-hospital cardiac arrest is poor. On the other hand, despite the advances in the medicine, there are some group of patients who still believe and apply alternative medicine. The use of alternative medicine in developed countries appears to be increasing. But it is an ignored fact that alternative medicine can be dangerous when used in conjunction with conventional medicine. Cider vinegar is made from apple; if undiluted, its pH varies between 4.25-5. Although esophageal injury by apple cider vinegar tablets has been reported, apart from our report, there is only one report in the literature presenting hypokalemia, hyperreninemia and also osteoporosis in a patient ingesting large amounts of cider vinegar. In this article, we present two cases of cardiac arrest due to cider vinegar induced hypokalemia.

Key Words: Hypokalemia; acetic acid; death, sudden

ÖZET Ani ölüm dünyada önemli bir sağlık problemidir. Hastane dışında kardiyak arrest prognozu kötüdür. Diğer yandan, tıptaki gelişmelere rağmen, halen alternatif tıbbi uygulayan bir grup hasta bulunmaktadır. Gelişmiş ülkelerde alternatif tıbbın kullanımı giderek artmaktadır. Fakat ihmal edilen bir gerçek var ki, alternatif tıp mevcut medikal tedavi ile birlikte kullanıldığında tehlikeli olabilir. Elma sirkesi elmadan elde edilir ve dilüye edilmediği takdirde pH değeri 4,24-5 arasında değişir. Elma sirkesi tabletlerine bağlı özofagus yaralanması rapor edilsede, literatürde bizim raporumuz dışında, çok miktarda elma sirkesi içtikten sonra hipokalemi ve hiperreninemi görülen ve osteoporoz gelişen sadece bir hasta bulunmaktadır. Bu makalede, elma sirkesine bağlı hipokaleminin tetiklediği iki ani kardiyak ölüm vakası takdim edilmiştir.

Anahtar Kelimeler: Hipokalemi; asetik asit; ölüm, ani

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Sudden cardiac death is a major health problem worldwide.¹ More than 95% of people who experience sudden cardiac arrest die and less than 50% of these patients do not have a history of coronary artery disease.^{2,3}

Alternative medicine is a health practice which is mostly based on cultural traditions rather than scientific evidence. Furthermore, some forms of alternative medicine may have life threatening consequences when used in conjunction with prescribed drugs.⁴

In this report, we present two cases who experienced sudden cardiac arrest after starting to use cider vinegar in addition to their present diuretic treatment.

CASE REPORTS

CASE 1

A 62 year-old woman admitted to the emergency service after cardiac resuscitation. On admission, the cardiac rhythm was ventricular fibrillation. Despite appropriate medical and electrical therapy a stable rhythm could not be obtained. Biochemical analysis revealed a potassium level of 2.3 mmol/L (reference range 3.5-5.1 mmol/L). After correction of potassium level, the frequency of ventricular tachyarrhythmias decreased. A coronary angiography did not show any signs of coronary artery disease. Echocardiography also did not reveal structural cardiac disease. Her cranial tomographic examination was normal. Her medical history was prominent only for essential hypertension treated with indapamide (a thiazide like diuretic) and amlodipin-valsartan combination. One month prior to the cardiac arrest, her potassium level was detected within normal ranges. However, her relatives have told that she has started to use cider vinegar in order to lose weight within the last months.

CASE 2

A 42 year old man was admitted to the emergency service after experiencing an out-of-hospital cardiac arrest. The initial cardiac rhythm was ventricular tachycardia. While intervention, his electrocardiogram showed ventricular fibrillation. A biochemical analysis showed a potassium level of 2.0 mmol/L (reference range 3.5-5.1 mmol/L). Cardiac resuscitation and appropriate medical therapy with potassium replacement were initiated and he was defibrillated about 10 times. After the correction of serum potassium level, no arrhythmias were observed. Coronary angiography was performed under cardiac resuscitation. But angiography showed no significant coronary artery disease. On echocardiographic examination, he had dilated cardiomyopathy with left ventricular ejection fraction of 30%. His med-

ical records revealed that he has been diagnosed for dilated cardiomyopathy for two years and has been using some medications including a beta blocker, an ACE-inhibitor and a diuretic (loop diuretic-furosemide). However, the patient said that two weeks ago, he has started to use cider-vinegar.

Before discharge, an implantable cardioverter defibrillator was implanted.

DISCUSSION

Sudden cardiac death is usually defined as an unexpected death from a cardiac cause occurring within a short time in a person with or without preexisting heart disease. Although sudden death is caused by coronary artery disease in more than 80% of cases, exclusion of a non-cardiac causes can be important as it was reported in our manuscript.^{3,5}

Recently in developed countries, the use of alternative medicine has increased.⁶ Furthermore medical doctors are often unaware of their patient's use of alternative medical treatments as only 38.5% of the patients using alternative therapies discuss this with their medical doctor.⁵ On the other hand, alternative medicine when used in conjunction with conventional medicine can be dangerous.^{4,7,8}

Cider vinegar is made from apple and has a brownish-yellow colour. If undiluted, the pH of the cider vinegar is between 4.25-5. In different cultures, cider vinegar is in use for many different treatments. Although the effect has not been tested in humans, two recent studies concluded that a test of group of rats fed with acetic acid had lower values of serum total cholesterol and triglyceride.^{9,10} Small amounts of vinegar added to food has been shown to reduce the glycemic index of carbohydrate food for people with and without diabetes.^{11,12} In a study of Hlebowicz et al., cider vinegar was shown to reduce the gastric emptying rate in patients with insulin-dependent diabetes mellitus.¹³ In addition to its antimicrobial use, multiple trials have also indicated that taking vinegar with food increases satiety so it is used for diet control.¹⁴

Although esophageal injury by apple cider vinegar tablets has been reported, apart from our

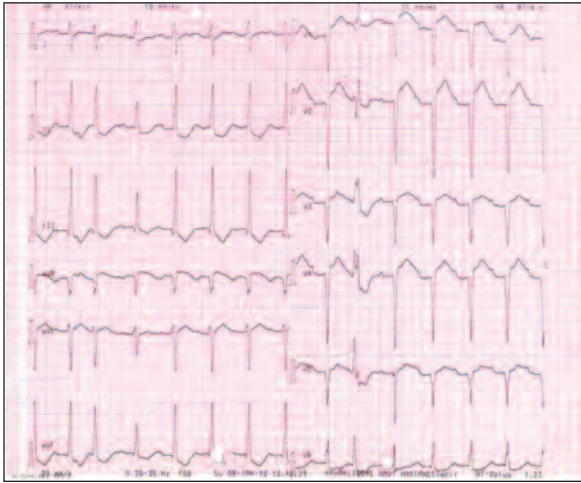


FIGURE 1: The 12-lead electrocardiogram recording of case-2. The corrected QT interval was measured as 0.61 msn.

(See color figure at

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report, there is only one report in the literature presenting hypokalemia, hyperreninemia and also osteoporosis in a patient ingesting large amounts of

cider vinegar.¹⁵ In our report, we presented two cases experiencing cardiac arrest due to hypokalemia. The amount of cider vinegar that the patients used were unknown but both of them were using a diuretic. And we thought that cider vinegar triggered the diuretic induced hypokalemia. The mechanism of hypokalemia related with the use of cider vinegar is not clear, but from the history of our two patients, we thought that it was used because of its possible diuretic effect. The hypokalemia in these patients might have induced QT prolongation and thus precipitated the malignant arrhythmias.¹⁶⁻¹⁹ The Figure 1 shows the 12-lead electrocardiogram of the case 2 where the corrected QT interval was measured as 610 msn.

In conclusion, we can say that alternative medicine can be dangerous even at the cost of cardiac arrest when used in conjunction with conventional medicine. So the physicians should warn the patients at least to make them aware of all the treatments that they are using.

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