

CASE REPORT

Resuscitated sudden cardiac death due to severe hypokalemia caused by teff grain herbal tea: A case report

Teff tohumlu bitkisel çayın neden olduğu ciddi hipokalemiye bağlı döndürülmüş ani kardiyak ölüm: Olgu sunumu

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Summary– Obesity is a common health problem and the prevalence is increasing worldwide. The improper and unregulated use of unconventional therapies, especially herbal treatment methods, has grown due to widespread availability. In our case, a 41-year-old male patient developed palpitation, confusion, loss of consciousness, and cardiac arrest while at home. An emergency medical team was called and chest compressions were performed by his wife until the medical team arrived. Ventricular fibrillation was detected on the monitor 5 minutes after the cardiac arrest occurred and the patient was defibrillated. A physical evaluation revealed hypotension and tachycardia. Electrocardiography (ECG) showed a fast idioventricular rhythm with capture and fusion beats and evident J waves in leads DII, DIII, and aVF. Brain magnetic resonance imaging and thoracic tomography revealed no pathology to explain his clinical condition and the coronary angiography results were not significant. The laboratory parameters included potassium (K): 2.23 mEq/L, ionized K (arterial blood): 2.43 mEq/L, sodium: 142 mEq/L, calcium: 9.3 mg/dL, creatinine: 1.6 mg/dL, pH: 7.29, cardiac troponin I: 0.12 (normal range: 0–0.11 ng/mL) and creatinine kinase mass: 8.3 (normal range: 0–3.23 ng/mL). After fluids and electrolyte replacement therapy were administered, the ECG results revealed narrow QRS complex atrial fibrillation followed by a normal sinus rhythm with a 490 ms corrected QT interval. The patient was extubated in follow-up. There were no risk factors for coronary artery disease, no history of drug or other substance use, and no exposure to excessive emotional or physical stress. The patient said that he had been consuming a large quantity of teff tea for 5 days to lose weight. He was discharged without any complications and has been asymptomatic in 9 months of follow-up. The inappropriate use of weight loss alternatives, especially herbal therapies such as teff tea, and the incidence of associated side effects are increasing due to wide availability and easy access. The general population should be warned about this issue.

Özet– Obezite, yaygın bir sağlık sorunudur ve dünyada giderek artmaktadır. Geleneksel olmayan tedavilerin, özellikle bitkisel tedavi yöntemlerinin uygunsuz ve kontrolsüz kullanımı, kolay bulunabilirlik nedeniyle artmıştır. Bizim vakanızda, 41 yaşında erkek hastada evde çarpıntı, bilinç bulanıklığı ve ardından bayılma gelişti. Bilinç kaybının ardından kalp durması meydana geldi. Acil tıbbi ekip çağırıldı ve acil tıbbi ekip gelene kadar eşi tarafından hastaya kalp masajı yapıldı. Kardiyak arrestten beş dakika sonra monitörde ventriküler fibrilasyon saptandı ve hasta defibrile edildi. Fizik muayenede hipotansiyon ve taşikardi saptandı. Elektrokardiyografide hızlı idioventriküler ritim, yakalama ve füzyon vurularıyla birlikte DII, DIII, aVF derivasyonlarında belirgin J dalgası izlendi. Beyin manyetik rezonans görüntüleme, torasik tomografide kliniği açıklayacak bir patoloji saptanmadı ve koroner anjiyografi normal koroner arterler olarak raporlandı. Laboratuvar parametreleri K=2.23 mEq/L, kan gazında iyonize K=2.43 mEq/L, Na=142 mEq/L, Ca=9.3 mg/dL, kreatinin=1.6 mg/dL, pH=7.29, cTnI=0.12 (0–0.11 ng/mL) ve kütle CK-MB=8.3 (0–3.23 ng/mL) olarak tespit edildi. Sıvı ve elektrolit replasman tedavisinden sonra elektrokardiyografide sırasıyla atriyal fibrilasyon ile birlikte dar QRS ve sonra düzeltilmiş QT değeri 490 ms ile birlikte normal sinüs ritmi görüldü. Hasta takipte ekstrebe edildi. Koroner arter hastalığı için bir risk faktörü, ilaç ya da madde kullanımı öyküsü ve duygusal veya fiziksel strese maruziyet yoktu. Kilo vermek için beş gündür yoğun bir şekilde “Teff” çayı aldığını belirtti. Hasta komplikasyonsuz taburcu edildi ve dokuz aydır asemptomatik takip edilmektedir. Kilo kaybı için uygun olmayan alternatiflerin kullanımı, özellikle Teff çayı gibi bitkisel tedaviler ve ilişkili yan etkiler, geniş kullanılabilirlik ve kolay erişim nedeniyle artmaktadır. Toplum bu konuda uyarılmalıdır.

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Obesity is an increasingly common global health problem.^[1] In addition to traditional treatments, the use of alternative therapies, and particularly herbal treatment methods, such as pepper pills, various tea extracts, and liquid concentrates, have grown. The improper and unmonitored use of these treatment methods have increased due to easy availability and access. Thus, the incidence of side effects associated with uncontrolled herbal treatments with the potential to lead to death has also increased.^[1-5]

This is an unusual case of resuscitated sudden cardiac death due to the ingestion of teff grain herbal tea secondary to hypokalemia and other electrolyte deficiencies.

CASE REPORT

While at home, a 41-year-old male patient developed palpitation, confusion, and loss of consciousness followed by sudden cardiac death. An emergency medical team was called and heart massage was performed by the patient's wife until the medical team arrived. Ventricular fibrillation was detected on the monitor by the emergency medical team 5 minutes after the cardiac arrest occurred and the patient was defibrillated and intubated. At the time of emergency department admission, an immediate physical evaluation revealed cold extremities and vital signs of blood pressure: 90/50 mmHg, pulse rate: 120 beats/min, arrhythmia, and a respiratory rate of 22 breaths/min. Electrocardiography (ECG) showed a fast idioventricular rhythm with capture and fusion beats as well as evident J waves in leads DII, DIII, and aVF (Fig. 1a). Brain diffusion magnetic resonance imaging and thoracic tomographic angiography revealed no pathology to explain his clinical condition. The laboratory parameters were K (potassium): 2.23 mEq/L, ionized K (from arterial blood gas): 2.43 mEq/L, sodium: 142 mEq/L, chloride: 98 mEq/L, calcium (Ca): 9.3 mg/dL, ionized Ca: 3 mg/dL (from arterial blood gas, reference range: 4.49–5.29 mg/dL), creatinine: 1.6 mg/dL, pH: 7.29, cardiac troponin I: 0.12 (normal range: 0–0.11 ng/mL) and creatinine kinase mass: 8.3 (normal range: 0–3.23 ng/mL). Coronary angiography revealed normal left anterior descending, circumflex and right coronary arteries (Video 1*). The patient was taken to the coronary intensive care unit after the

Abbreviations:

CA	Calcium
ECG	Electrocardiography
K	Potassium

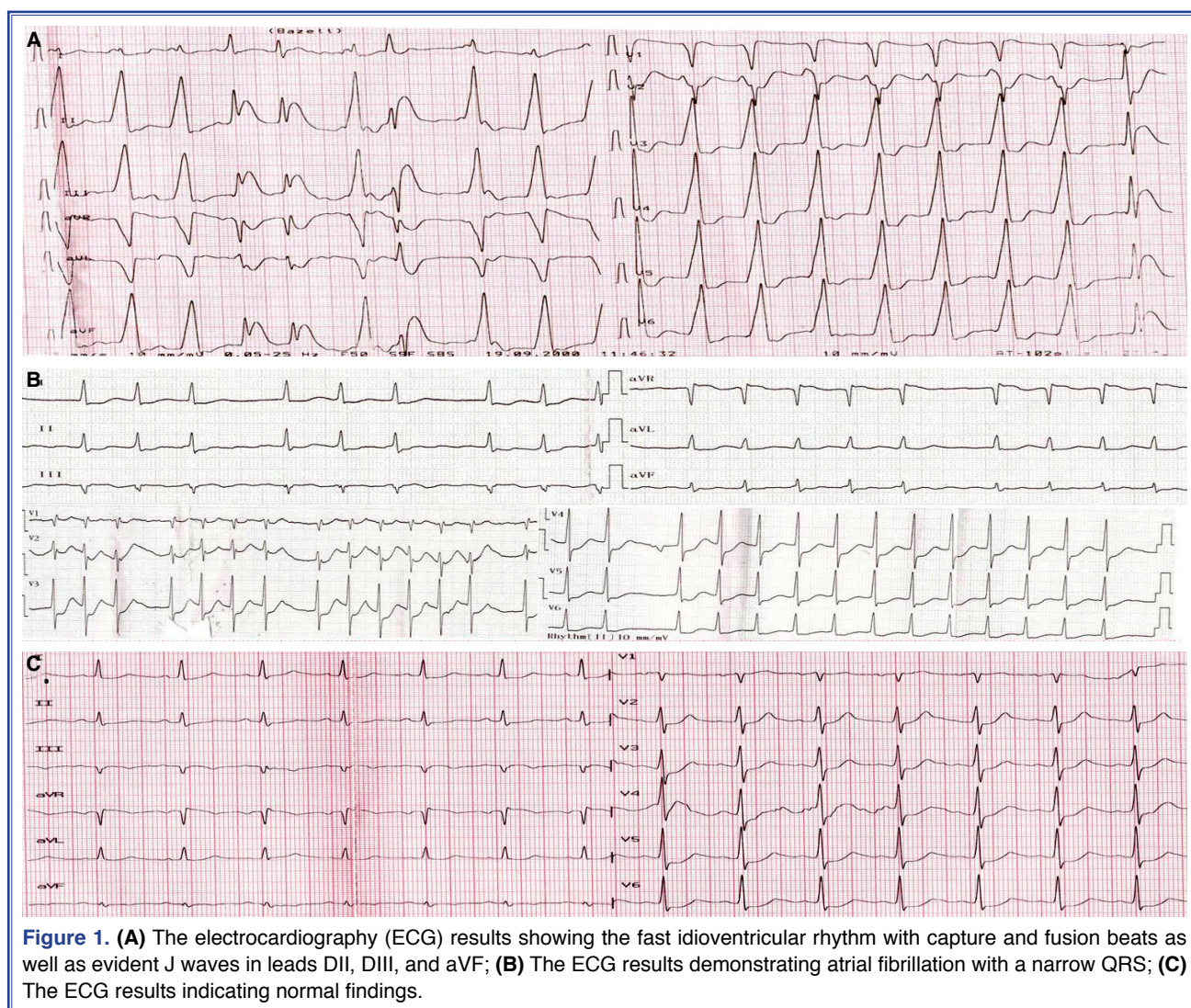
angiography and extubated in follow-up care. There were no risk factors for coronary artery disease, no drug or other substance use history, no sudden cardiac death in the family and no exposure to recent excessive emotional or physical stress. His body mass index measurement was 34 kg/m². Upon obtaining a detailed history, the patient said that he had been consuming a large quantity (about 4–5 cups/day) of teff tea for the previous 5 days in an effort to lose weight. Teff tea is a mixed herbal tea that contains teff seeds and other herbs, such as sage, green tea, heather, senna, fennel, mate, thyme, rosehip, green coffee, rosemary, acai, safflower seeds, chia seeds, ginseng, etc. Echocardiography indicated an ejection fraction of 60% (modified Simpson's method) and normokinesia of the left ventricular walls. Magnesium (2 g magnesium sulphate in 10 minutes, once) in particular, as well as potassium and fluid replacement therapies were initiated. Follow-up ECG showed atrial fibrillation with a narrow QRS complex (Fig. 1b). The potassium and other electrolyte parameters subsequently improved. The next day, the ECG corrected QT was calculated as 490 ms, and the other findings and rhythm spontaneously improved (Fig. 1c). The patient was discharged without any complications and has been asymptomatic in 9 months of follow-up.

DISCUSSION

To the best of our knowledge, this is the first case of resuscitated sudden cardiac death due to severe hypokalemia caused by teff grain herbal tea.

Teff (*Eragrostis tef*) is a grain native to Ethiopia. Teff is a rich source of protein, dietary fiber, unsaturated lipids, polyphenols, vitamins, and certain minerals.^[6] Full grain teff flour has become an increasingly important ingredient in healthy foods and has been used to produce various gluten-free food items. Consumption of teff grain provides adequate nutrition without adding weight to the body. Therefore, it can help in weight control. It delivers a feeling of fullness for a long period due to dietary fiber and can prevent unnecessary snacking. However, ingestion of teff in large quantities is not recommended due to the high phytate content, which inhibits mineral absorption. This can lead to electrolyte and mineral deficiencies.^[6]

Teff seed tea is prepared by adding some 20 kinds of herbs together with teff seeds.^[2,3,6,7] These teas are commonly sold as "fast weight loss" products and are



easily available. Several so-called healthy drinks, teas, and “fast weight loss” pills contain potentially toxic metabolites, such as caffeine, sibutramine, a laxative (bisacodyl), and a diuretic (hydrochlorothiazide).^[7] These agents can cause severe fluid and electrolyte loss that can induce malignant cardiac arrhythmias.^[3,6,7] Along with this loss of water, there is also a loss of a large quantity of potassium, magnesium, and other electrolytes. In the present case, it was concluded that hypokalemia developed after substantial ingestion of teff grain herbal tea. Hypokalemia leads to prolongation of the QT interval, delayed myocardial repolarization, heterogeneity of repolarization in myocardial and Purkinje cells, triggered ventricular activity (due to early and delayed afterdepolarizations), torsades de pointes-type lethal polymorphic ventricular tachycardia, and ventricular fibrillation.^[8] The ECG findings

detected after resuscitation supported a diagnosis of arrhythmia secondary to hypokalemia and improved with the replacement of potassium, magnesium, and other electrolytes. There were no causes of sudden cardiac death, such as a coronary anomaly, coronary artery disease, cardiomyopathy, a family history of sudden cardiac death and coronary vasospasm inducing factors, drug or other substance use, or recent excessive emotional or physical stress. The J wave pattern in the DII, DIII, and aVF leads completely disappeared after the replacement of potassium and other electrolytes. This supports a conclusion of a J wave phenocopy pattern induced by deep hypokalemia rather than true early repolarization syndrome or a true genetic J wave with malignant features.^[9]

The uncontrolled use, wide availability, and easy access to various weight loss methods such as herbal

teas create the potential for the development of important side effects that could include fatal complications. To prevent these severe complications, special warning labels and notice of the potential side effects should be added to the packages of these herbal products. Furthermore, public awareness should be raised using communication outlets such as TV, newspapers, and the Internet.

*Supplementary video file associated with this article can be found in the online version of the journal.

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Anahtar sözcükler: Hipokalemi; obezite; düzeltilmiş ani kardiyak ölüm; teff çayı; kilo kaybı.