

A Rare Cause of Hyperkalemia: Excessive Potassium Intake with Diet Does Hyperkalemia Occur After Eating Bananas?

Hiperkaleminin Nadir Nedenlerinden Biri: Diyetle Fazla Miktarda Potasyum Alımı Muz Yeme Sonrası Hiperkalemi Olur mu?

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Abstract

Hyperkalemia is a rare condition after the dietary intake of large amounts of potassium. It may be more likely to occur in patients with impaired renal function and multiple drug use. Since potassium disorders lead to cardiac effects, life-threatening cardiac arrhythmias may occur when they are not recognized or treated. We detected hyperkalemia in the patient who came to our emergency department with a complaint of nausea. The anamnesis of the patient was detailed, and it was learned that the patient had excessive consumption of bananas with diet. It should be borne in mind that there may be problems with excretion of potassium in the elderly and patients with additional diseases. Treatment of our patient in the emergency department was started early and potassium was reduced to normal limits. Dietary intake should be questioned in addition to kidney dysfunction in all patients with hyperkalemia.

Keywords: Hyperkalemia, diet, ECG

Özet

Diyetle fazla miktarda potasyum alımı sonrasında hiperkalemi nadir gelişen bir durumdur. Özellikle böbrek fonksiyon bozukluğu ve çoklu ilaç kullanımı olan hastalarda görülme ihtimali artabilir. Potasyum bozuklukları kardiyak etkilenime yol açtığından tanınmadığı veya tedavi edilmediği durumlarda hayatı tehdit eden kardiyak aritmiler görülebilir. Acil servisimize bulantı şikayeti ile gelen hastada hiperkalemi saptanmıştır. Hastanın anamnezi tekrar alındı ve diyetle aşırı miktarda muz tüketimi olduğu öğrenildi. Yaşlılarda ve ek hastalığı olan hastalarda potasyumun atılımı ile ilgili problemler olabileceği akılda tutulmalıdır. Hastamızın acil serviste tedavisi erken dönemde başlanarak ve potasyumu normal sınırlara düşürülmüştür. Hiperkalemi saptanan tüm hastalarda böbrek fonksiyon bozukluklarına ek olarak diyet alımı da sorgulanmalıdır.

Anahtar Kelimeler: Hiperkalemi, diet, EKG

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1. Introduction

Hyperkalemia is one of the important life-threatening clinical scenarios in the emergency department. Mainly due to cardiac arrhythmia and cardiac arrest caused, it should be diagnosed at an early period and its treatment should be started (1). Causes of hyperkalemia include; excessive potassium intake with diet, decreased potassium excretion, shift through the cell membrane to the extracellular compartment. Hyperkalemia, as a result of excessive potassium intake, is very rare in those with normal kidney function. Hyperkalemia can be compensated by the renal mechanisms that absorb potassium into the cell and ensure its excretion from the kidney.

In the literature, cases have been reported about hyperkalemia due to the consumption of orange juice, tomato juice, apple juice, apricot, dried fruit, and banana (2). Cardiac arrhythmias and ST-segment elevation after apricot and banana consumption have been shown, especially in patients with renal dysfunction (3).

Normally, the potassium level should be 3.5-5.0 mEq / L in serum. However, clinically significant effects are seen when the serum potassium level rises above 6.5 mEq / L. Patients may present with asymptomatic muscle cramps, paralysis, decreased deep tendon reflexes, and arrhythmias (1).

In this case report, we present a patient who admitted to the emergency department with the complaint of nausea and vomiting and who developed hyperkalemia because he ate too much banana and dried fruit in his diet.

2. Case Report

A 60-year-old male patient admitted to the emergency department with a complaint of nausea. The patient who had Type 2 diabetes mellitus and coronary artery disease in his past medical history, also complained of watery diarrhea for a week. The vitals of the patient were: Blood Pressure: 120/70 mmHg, a heart rate of 80 beats/min, body temperature of 36.5 °C, and oxygen saturation of 99%. His medications include nebivolol, metformin combined with vildagliptin, trimetazidine, acetylsalicylic acid, amlodipine, atorvastatin, and ticagrelor. Peaked T-wave were noticeable in the all leads of ECG. Therefore, ST-segment elevation was associated with suspected AMI or hyperkalemia, and treatment for the acute coronary syndrome was initiated. Laboratory parameters were: Cr: 1.39 mg/dl, BUN: 24.7 mg/dl, GFR: 55.08 ml/min, K: 7.75 mEq/L, pH: 7.352, and HCO₃: 20 mmol/L. During the observation in ED, the widening of QRS complexes developed in the subsequent ECG (Fig.1B), prompt intravenous glucose and insulin and calcium infusions, inhaled salbutamol, to enhance potassium uptake into the cells. When the patient was questioned again, he told that he took his medications regularly and did not take any other medication. However, since he had diarrhea for several days, he stated that he ate 5 large bananas, a large number of raisins and walnuts the day before. In the ECG of the patient whose potassium level decreased, T sharpness decreased as shown (Fig.1C). High sensitivity troponin levels were all in normal limits. The patient's ECG further recovered after 1 day of follow-up, and the potassium level decreased to 5.3 mEq/L (Fig.1D and Fig.1E). In the re-evaluation after discharge, the patient evaluated in polyclinic, it was observed that potassium levels were within normal limits.

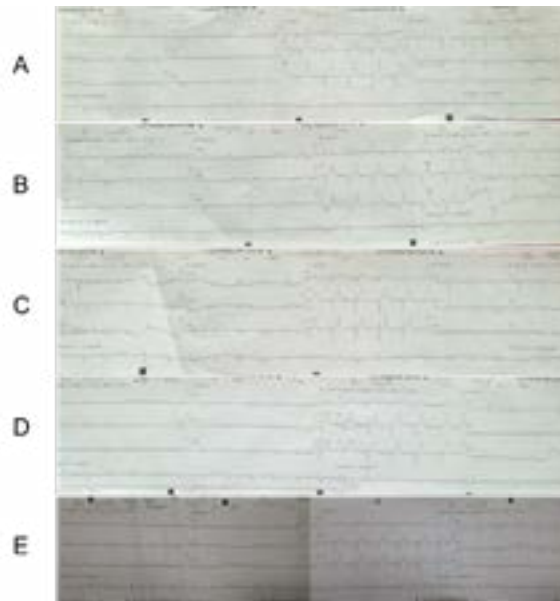


Figure 1. The ECG findings of the patient.

A) First ECG 19:40 peaked T waves. B) 20:20 peaked T waves and wide QRS. C) 21:50 After treatment narrow QRS. D) Next day 13:00 E) 16:00 normal ECG

3. Discussion

Hyperkalemia rarely develops as a result of excessive intake of potassium with diet. Hyperkalemia is an important clinical condition that should be considered, especially in patients with beta-blocker use and in diabetic patients. It should be acknowledged that it can be life-threatening leading to ventricular arrhythmias. In a case report published in 2012, ventricular tachycardia due to hyperkalemia was described (3).

Diet-related hyperkalemia is a very rare cause of hyperkalemia (4,5). A decrease the kidney's potassium excretion capacity both increases the susceptibility of the organism to diet-related hyperkalemia and causes transcellular potassium transitions in the distal nephron (5). Therefore, diet-related hyperkalemia is expected to occur more in patients with impaired renal function (4) and diabetes (6). The cause of hyperkalemia may be excessive banana consumption or drug side effects. In particular, potassium-sparing diuretics and beta-blockers can lead to hyperkalemia. In our case, the patient was not on potassium-sparing diuretics and it was acknowledged that he did

not make any changes in the beta-blocker dose he had used for months. Also, beta-blocker toxicity was not considered in the patient because bradycardia was not present. The amount of potassium with dietary intake may not be tolerated, even mildly impaired renal function, and due to the use of beta-blockers.

An average banana contains 360 mg of potassium per 100 grams (7). It has been shown that the amount of potassium intake in exercise increases serum potassium, although kidney function is normal (8). Therefore, it should be kept in mind that hyperkalaemia will develop even if there is no underlying disease.

When ECG findings are evaluated, serum potassium levels, especially above 8 mEq / L, may lead to QRS axis changes, intraventricular blocks, sinus wave pattern, and VF and asystole-related deaths. When moderately (Serum potassium 6.5-8.0 mEq / L) elevated, QRS width, decreased P wave amplitude and prolonged PR segment can be observed (9). In our case, QRS widening was

observed in the 2nd ECG. Since severe hyperkalemia may be observed in the absence of treatment, the ECG findings of hyperkalemia should be well known by physicians.

Studies have shown that patients do not systematically evaluate dietary properties (10). In this respect, patients with medications that affect potassium metabolism, kidney failure, and diabetes should be informed about

their potassium content in their diets when prescribing these drugs.

Diet-related hyperkalemia should be kept in mind in patients with diabetes, renal failure, the elderly, and those who are on polypharmacy. In patients with symptoms and laboratory findings, it will be appropriate to warn patients, although the treatment does not change.

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