Lessons From Practice

Severe Hyperkalemia and Life-Threatening Events After Dates Consumption During Ramadan in End-Stage Renal Failure Patient

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Abstract

Dates, a traditional and culturally significant food consumed by Muslims worldwide to break fast during Ramadan, are high in potassium. While generally considered nutritious, their intake poses a serious risk to individuals with impaired renal function. Hyperkalemia is a potentially fatal electrolyte disturbance in patients with end-stage kidney disease (ESKD) due to impaired potassium excretion. We discuss a case of life-threatening hyperkalemia in an ESKD patient precipitated by excessive date consumption during Ramadan. This case emphasizes the importance of dietary potassium restriction, timely recognition of hyperkalemia, and the need for rapid potassium-lowering interventions. It also highlights the critical role of patient education and individualized dietary counseling in preventing recurrent, potentially fatal events in this high-risk population.

Keywords: *hyperkalemia, end-stage kidney disease, dates, Ramadan*

CLINICAL CASE

A 50-year-old Malay Muslim male with a known history of end-stage kidney disease (ESKD) on regular hemodialysis presented with an abrupt onset of dyspnea associated with epigastric discomfort during the month of Ramadan. His past medical history was significant for diabetes mellitus and hypertension. At the presentation, physical examination findings were unremarkable. However, electrocardiographic evaluation revealed significant arrhythmias, as illustrated in Figures 1a and 1b.

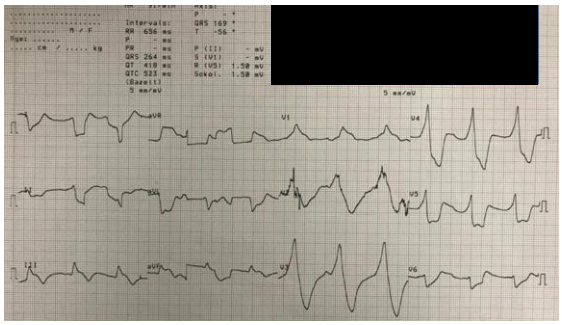

Figure 1a: An electrocardiogram at 0728H (during admission) showed broad QRS complexes with peak T waves. Multiple rapid premature ventricular response with right axis deviation.

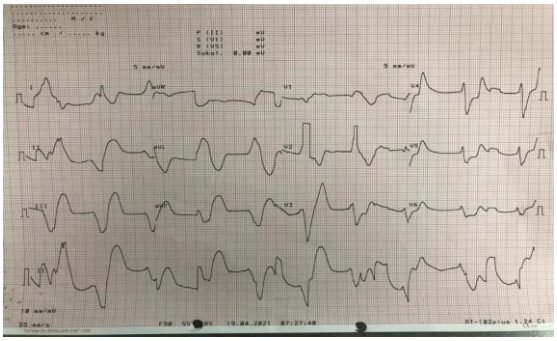

Figure 1b: An electrocardiogram at 0730H showed a broadening of QRS complexes with peak T waves. Development of sine waves pattern seen. Ventricular fibrillation is eminent.

Arterial blood gas analysis showed a markedly elevated serum potassium level of 8.7 mmol/L (sample confirmed non-hemolysed). A review of previous records from the dialysis unit revealed a baseline potassium level ranging from 4.0 to 4.6 mmol/L, with documented adequate dialysis clearance. His regular medications included Atorvastatin 40 mg once daily, Calcium carbonate 1.5 g three times daily, Felodipine 10 mg twice daily, Ferrous fumarate 400 mg once daily, Folic acid 5 mg once daily, Furosemide (Lasix) 80 mg three times daily, and Perindopril 8 mg once daily.

Further dietary history revealed that the patient had been consuming approximately eight dates daily to break his fast during Ramadan. The patient experienced sudden cardiac arrest, becoming unresponsive and pulseless. Cardiac monitoring demonstrated ventricular tachycardia, which progressed to ventricular fibrillation. Immediate advanced cardiac life support (ACLS) was initiated, including endotracheal intubation, cardiopulmonary resuscitation (CPR), and defibrillation.

He achieved a return of spontaneous circulation (ROSC) after 28 minutes and five defibrillation attempts. Intravenous Amiodarone (300 mg) was administered after the third shock. Concurrent management of hyperkalemia included intravenous calcium gluconate, insulin with glucose, and emergency hemodialysis initiated in the emergency department (ED). This intervention successfully reduced serum potassium to 5.8 mmol/L.

The patient required multiple subsequent dialysis sessions in combination with oral calcium-polystyrene sulfonate (Kalimate) until potassium levels stabilised. Normalisation of the electrocardiogram (ECG) was observed following the resolution of hyperkalemia (Figure 2). The renal function trends are summarised in Table 1.

Additional laboratory investigations revealed a haemoglobin level of 8.4 g/dL, serum albumin of 32 mmol/L, corrected calcium of 1.90 mmol/L, and phosphate of 2.45 mmol/L. The patient was extubated 48 hours post-resuscitation and made a complete neurological recovery despite the prolonged cardiac arrest. He was subsequently discharged in a stable condition with comprehensive dietary counselling emphasising potassium restriction.

Table 1: Renal profile trend during the admission.

	Admission	Urgent HD	Second HD	Third HD	On discharge
Potassium (mmol/L)	8.9	7.1	5.2	4.7	4.3
Sodium (mmol/L)	133	135	133	132	130
Urea (mmol/L)	22.7	18.4	11.0	16.7	19.3
Creatinine (µmol/L)	716	556	408	511	610

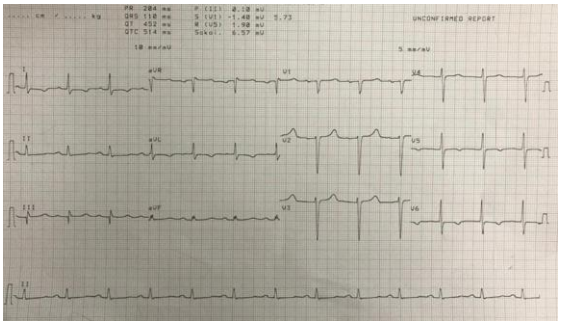

Figure 2: A repeat electrocardiogram post hemodialysis showed a sinus rhythm.

DISCUSSION

Dates are a widely consumed fruit among Muslims, particularly during Ramadan, due to their cultural and religious significance in breaking the fast. In Malaysia, their popularity is further driven by tradition, perceived health benefits, and taste. While dates are a convenient source of energy—providing approximately 230 kcal per 100 grams—they are also rich in sugar (80%) and contain essential nutrients such as protein, fibre, and minerals, including high levels of potassium. Depending on the variety, potassium content can exceed 600 mg or even 1000 mg per 100 grams.[1,2]

For patients with renal impairment, especially those with ESKD, this high potassium content poses a significant risk of hyperkalemia. Consequently, nephrologists traditionally advise such patients to avoid dates. However, a small Saudi Arabian study indicated that in carefully selected hemodialysis patients without pre-existing hyperkalemia, consuming 100 grams of dates before dialysis did not significantly elevate potassium levels.[3] Despite this, the study's limitations—such as exclusion of diabetic patients and those on ACE inhibitors—necessitate cautious interpretation. Thus, dietary recommendations regarding date consumption should be individualized based on patient comorbidities, medications, and dialysis schedules. Importantly, many Muslim patients assume dates are safe during Ramadan, underscoring the need for proactive, culturally sensitive dietary counseling in this population.

Our patient consumed eight dates daily, including on non-dialysis days, while also taking an ACE inhibitor and having diabetes mellitus. Both are factors that precipitated severe hyperkalemia. ECG features of hyperkalemia typically appear at potassium concentrations >6.7 mmol/L and include peaked T-waves, PR prolongation, QRS widening, and eventually a sine wave pattern and asystole. Early ECG changes may precede overt symptoms and are critical for

timely diagnosis. The most common clinical manifestation of severe hyperkalemia involves patients with ESKD and primarily manifests as severe weakness or arrhythmias.[4]

Management of life-threatening hyperkalemia involves rapid stabilization with calcium gluconate to counteract myocardial excitability, shifting potassium intracellularly using insulin with glucose, and definitive removal through dialysis. In our case, the patient's cardiac rhythm stabilized only after dialysis, indicating refractory hyperkalemia.

CONCLUSION

A thorough dietary history is essential in patients with ESKD, particularly during Ramadan, to identify and mitigate the risk of hyperkalemia-related complications such as dyspnoea. Hyperkalemia remains a major contributor to morbidity and mortality in this population. Prevention through patient education, early recognition using electrocardiography, and prompt, targeted intervention are key to improving clinical outcomes.

ABBREVIATIONS

ESKD	End-Stage Kidney Disease
IPD	Intermittent Peritoneal Dialysis
ECG	Electrocardiogram
CPR	Cardio-pulmonary resuscitation
DC	Direct current
HD	Hemodialysis

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LESSONS FROM PRACTICE

- Individualized dietary advice is essential for ESKD patients, especially during Ramadan, to prevent potassium overload from dates.
- Medications such as ACE inhibitors can exacerbate hyperkalemia
- Early ECG interpretation is crucial for recognizing hyperkalemia before lab confirmation.
- Rapid, combined treatment, including IV calcium, insulin-glucose, and urgent dialysis, is vital to manage severe hyperkalemia and prevent fatal arrhythmias.

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