Hyperkalaemia and cardiac conduction block: an initial presentation of chronic kidney disease mimicking cardiac emergency

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DESCRIPTION

A 60-year-old woman without previous comorbidities presented to the emergency department with acute onset difficulty breathing and dizziness for few hours. She reported of diffuse abdominal pain, vomiting and reduced urine output for 2 weeks. At admission, the pulse was 86 per minute and irregular and blood pressure was 146/74 mm Hg. Electrocardiography (ECG) revealed irregular, wide QRS escape rhythms with no distinct P waves and peaked T waves (figure 1). Initially, a possibility of complete heart block was kept in the background of advanced age and hypertension. However, biochemistry panel showed serum potassium of 8.0 mEq/L (normal, 3.5–5.0) and serum creatinine 21.0 mg/dL (normal, 0.6–1.2). She had metabolic acidosis (pH 7.27 and bicarbonate 10.7 mmol/L) and anaemia (haemoglobin 79 g/L). Ultrasonography revealed bilateral small kidneys (7.5 cm and 8.0 cm) with lost corticomedullary differentiation. The patient immediately received haemodialysis. Post dialysis, potassium corrected (5.0 mEq/L) and ECG showed sinus rhythm and normalisation of the QRS interval and P and T waves (figure 2). She was discharged on maintenance haemodialysis for chronic kidney disease stage 5.

Hyperkalaemia is associated with various ECG changes, loosely correlated with absolute value and rate of rising serum potassium.^{1 2} Tall, 'peaked' T waves with a narrow base typically appear as the earliest and the most common ECG abnormality, predominantly seen in the precordial leads V₂–V₄. The greater degree of hyperkalaemia causes conduction disturbances with atrioventricular block manifesting as PR interval prolongation. Further, block in the distal His or bundle branches manifests as widening of QRS.³ Sinoatrial node involvement causes P waves' amplitude reduction, and with

Figure 2 Postdialysis electrocardiography showing sinus rhythm with normalisation of the QRS interval and P and T waves.

the disappearance of P waves, a wide QRS escape rhythm appears on ECG. The continuous widening of QRS until the merging of S and T waves results in a 'sine wave' pattern that typically shortly precedes ventricular tachyarrhythmia.^{1–3}

Learning points

- ▶ Because hyperkalaemia is associated with various cardiac conduction abnormalities, an initial presentation of chronic kidney disease with hyperkalaemia may mimic a cardiac emergency, especially in older adults.
- ▶ Prompt recognition of hyperkalaemia-related electrocardiography changes is life-saving.

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Figure 1 Electrocardiography showing irregular, wide QRS escape rhythms with no distinct P waves and peaked T waves.

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