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Electrocardiogram Sine Wave in Hyperkalemia

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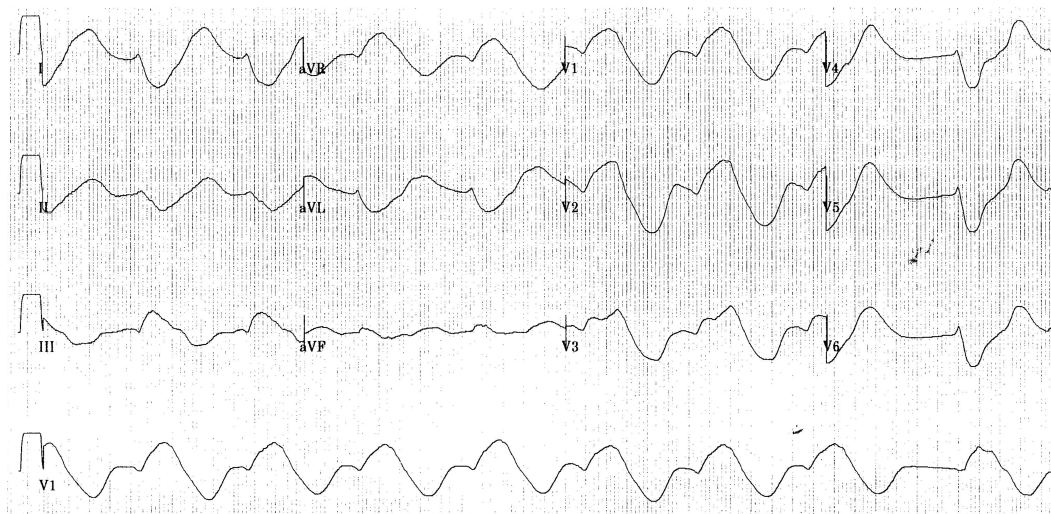


Figure. A 12-lead electrocardiogram showing a wide complex idioventricular rhythm

Emergency medical personnel were summoned to the home of a 47-year-old male with altered mental status. Upon arrival in the emergency department he was increasingly agitated and unable to provide a medical history. Because a dialysis fistula was found on his left forearm, a history of end stage renal disease (ESRD) was presumed. A home health worker arrived and confirmed he had missed his last three dialysis sessions.

Physical exam revealed an agitated male with blood pressure 116/49 mm Hg, pulse 54 bpm and respirations 24 bpm. Cardiac monitor showed a wide complex rhythm as the patient developed hypotension, non-invasive blood pressure 60/40 mm Hg. After fluid boluses the patient's blood pressure improved and the lung sounds remained clear. Neurologically he remained awake but disoriented and would not cooperate with a neurologic exam. A 12-lead electrocardiogram (ECG) showed a wide complex idioventricular rhythm (Figure 1). He was then presumptively treated for hyperkalemia with calcium gluconate, insulin-dextrose infusion, bicarbonate, and albuterol nebulizations. We obtained serial ECGs, on which the QRS was noted to progressively narrow. The patient's potassium returned at 9.3 mmol/L. He was then given sodium polystyrene and admitted to the intensive care unit with nephrology consult for emergent hemodialysis.

As this presentation demonstrates, early recognition of hyperkalemia is essential to successful treatment. However, patients with severe hyperkalemia commonly have electrolyte-induced arrhythmias that may rapidly become fatal if unrecognized. Any patient with an unconventional presentation and predisposing risk factors must be evaluated for electrolyte imbalance. The most common predisposing factor continues to be renal dysfunction. Effective emergency treatment consists of calcium,¹ insulin-glucose, bicarbonate and albuterol nebulizations.² To prevent rapid recurrence during hospital course or after discharge the causative condition must be identified.

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