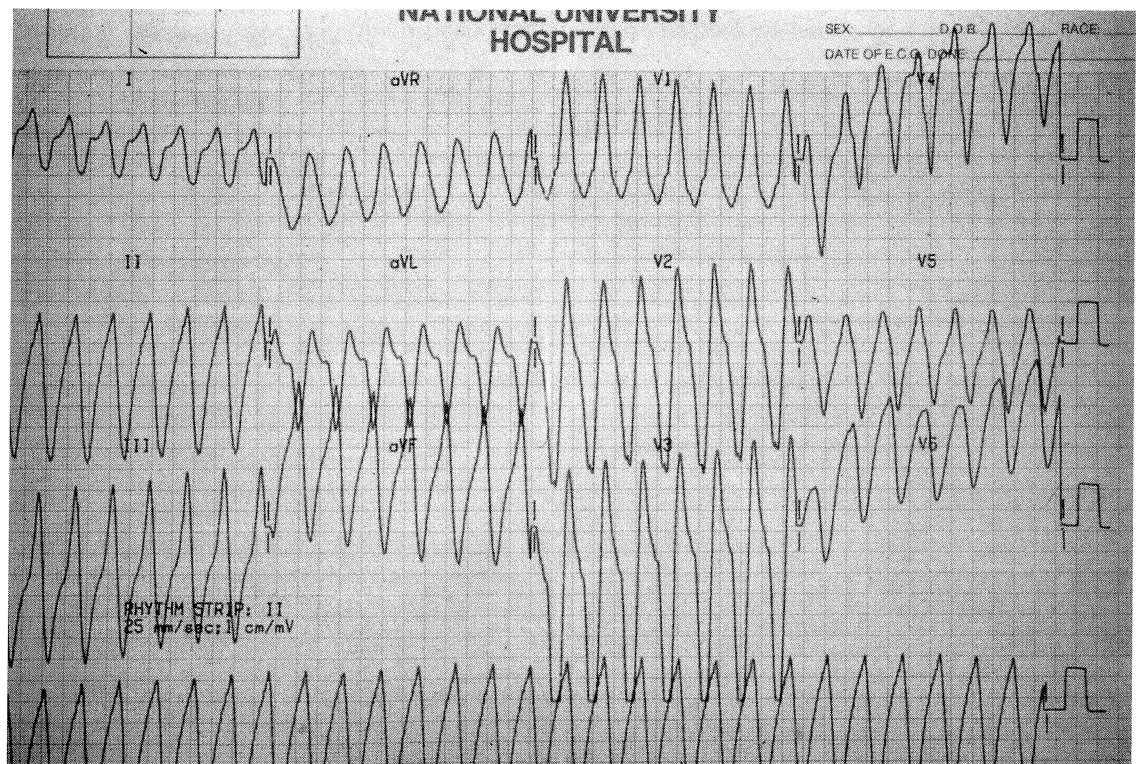


# Abnormal Electrocardiographic Patterns in Renal Failure

S C Quek, B Murugasu, H K Yap



## ABSTRACT

A 9-year-old girl was diagnosed to have renal failure. However, her family has not been compliant with medical treatment and opted for traditional therapy instead. She was admitted in an ill state with fluid overload. What is the ECG diagnosis?

Division of Cardiology  
 Department of Paediatrics  
 National University Hospital  
 5 Lower Kent Ridge Road  
 Singapore 119074

S C Quek, MBBS,  
 MMed (Paeds), FAMS  
 Senior Lecturer and  
 Consultant

B Murugasu, MBBS,  
 MMed (Paeds)  
 Senior Consultant

H K Yap, MBBS, MD, FAMS  
 Senior Consultant

Correspondence to:  
 Dr S C Quek

**Answer: Ventricular tachycardia**

**DISCUSSION**

This patient was admitted with hyperkalemia (serum potassium of 8.8 mEq/L). She was in overt renal failure with severe metabolic acidosis.

The danger of potassium excess lies in its potential in causing cardiac arrest. ECG changes are well documented in hyperkalaemic states and the patterns vary depending on the degree of hyperkalaemia. Early signs include a tall, peaked and symmetric T wave (so-called tented T wave). Prolongation of the QRS duration (intraventricular block) and/or the PR interval are other features. This may be followed by disappearance of the p wave. Higher levels may lead to wide, bizarre QRS complexes which can progress to ventricular tachycardia, as depicted in the ECG. It is extremely important to recognise this pattern, as ventricular fibrillation and cardiac arrest can ensue. Prompt recognition of these ECG changes can lead to the appropriate action being taken to avoid cardiac arrest.

It is useful to realise that ECG abnormalities can result from electrolyte disturbances. In fact, in this patient, after correcting the hyperkalaemia, the ECG pattern reverted to sinus rhythm promptly.

Management of hyperkalaemia depends on severity. Mild cases can be treated with resin binders. More severe cases require the intravenous infusion of calcium to counteract the deleterious effects of potassium on the myocardium. Infusion of glucose and insulin to promote movement of potassium into cells should also be given in the severe cases, and attention paid to treating metabolic acidosis. Finally, dialysis may be necessary for hyperkalaemia resulting from renal failure.

The cornerstone of managing hyperkalaemia is prevention. In conditions where elevated potassium are expected, a no-added potassium policy should be maintained. Early treatment is mandatory if side-effects on the heart are to be avoided. Finally, it is important for clinicians to realise that electrolyte abnormalities can account for cardiac dysrhythmias, and correction of electrolytes may be all that is necessary to revert the rhythm disorder. This should be performed first before resorting to the use of antiarrhythmic agents, which are not without their own attendant problems.

**REFERENCES**

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