

Images

Hyperkalemia and atrial pacemakers: what can the electrocardiogram tell you?

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QRS complex widening is a pivotal determination in patients with hyperkalemia. We present a case of a patient with hyperkalemia and an atrial pacemaker. This case highlights important points in analysis of the electrocardiogram (ECG) in patients with atrial pacemakers who have hyperkalemia.

CASE PRESENTATION

A 73-year-old white male with a history of coronary artery disease, congestive heart failure, diabetes mellitus, and pacemaker/implantable cardioverter defibrillator placement presented to the emergency department with a chief complaint of abnormal laboratory tests. On arrival, he complained of nausea, vomiting,

diaphoresis, and shortness of breath. Physical examination revealed pulmonary rales and peripheral edema. His presenting and previous ECGs are shown in Figure 1 and Figure 2, respectively. The patient was found to be hyperkalemic secondary to acute renal insufficiency, and after standard emergency department treatment and emergent dialysis, the patient was stabilized and discharged home in 2 days.

LEARNING POINTS

In comparison with the previous ECG, the ECG on presentation of this patient was notable for a widened QRS complex, suggesting a metabolic complication affecting cardiac depolarization. Although patients

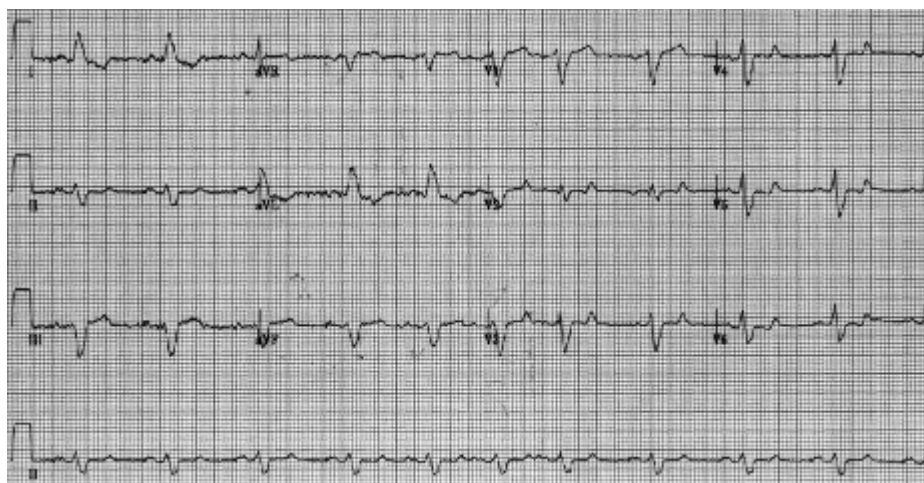


Figure 1. Electrocardiogram on presentation.

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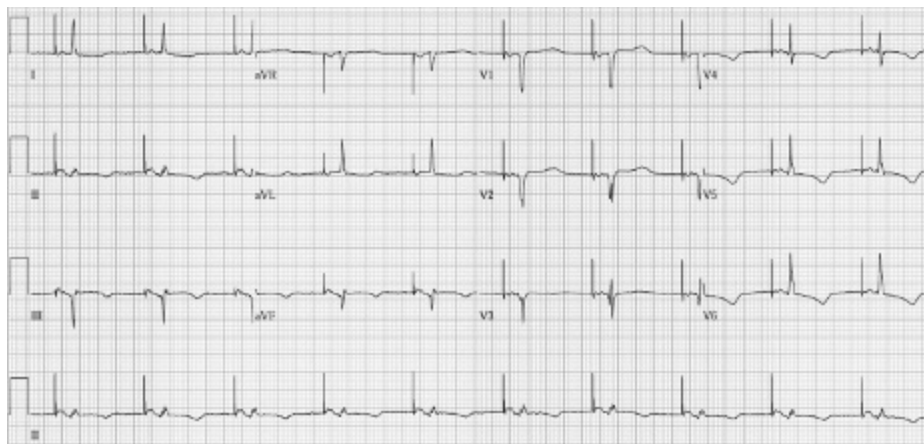


Figure 2. Electrocardiogram at baseline.

with pacemakers typically show evidence of a widened QRS complex on ECG, this is only the case with ventricular paced devices owing to the bypassing of the sinoatrial and atrioventricular nodes for cardiac electrical activation.¹ As can be seen on both ECGs, our patient had an atrial pacemaker device, as evidenced by pacing spikes before the P waves. Atrial pacemaker devices should not cause a widened QRS complex in the absence of metabolic derangement. Emergency physicians should carefully note the type of pacemaker device to avoid the assumption that a widened QRS complex in pacemaker patients is expected and not due to metabolic derangement, delaying necessary emergent treatment. Verification of device type can be

obtained by asking patients for their pacemaker card or by radiograph.²

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Keywords: atrial pacemaker, hyperkalemia, electrocardiogram, widened QRS

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