

Tremor-induced Electrocardiographic Artifact Mimicking Atrial Flutter

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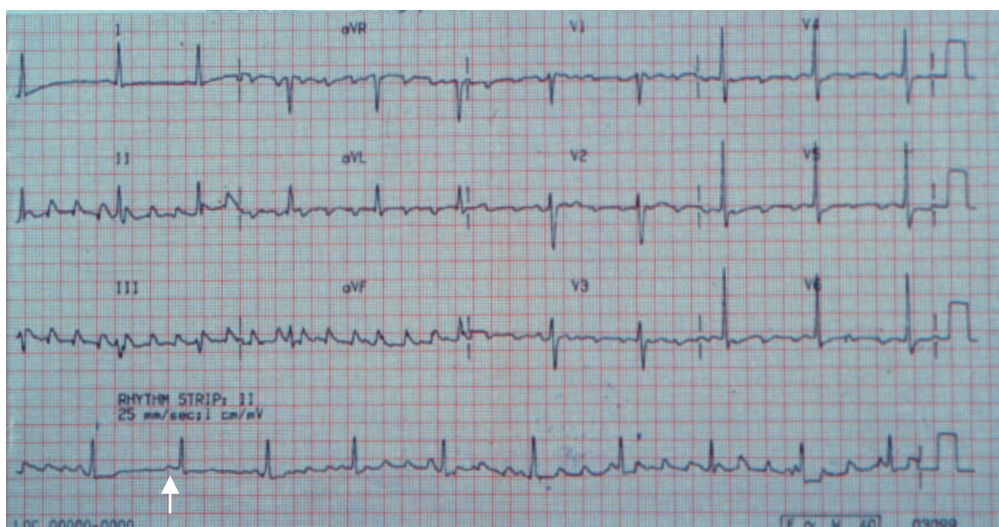


Figure. Electrocardiogram showing tremor-induced artifact mimicking atrial flutter.

Rest tremor of the limbs at a frequency of 4–5 Hz is a cardinal feature of Parkinson's disease. The tremor itself is usually responsive to medications and does not cause significant troubles for most patients. However, the artifacts related to the tremulous limbs may cause diagnostic problems in some special situations.

This 57-year-old woman had a history of Parkinson's disease for 1.5 years. Her initial symptoms were rest tremor and bradykinesia of the left upper limb, with later spreading to involve the left lower limb. She

was at Hoehn and Yahr stage I and she did not take any medications for Parkinson's disease. She had a medical history of hypertension, hyperlipidemia and coronary artery disease. She was treated with isosorbide dinitrate 10 mg tid, diltiazem 30 mg tid, propranolol 10 mg tid, and sublingual nitroglycerin 0.6 mg as needed. One day, she reported chest discomfort and shortness of breath to her attending cardiologist. An electrocardiogram (ECG) was ordered with the clinical information of hypertension and coronary artery disease attached. The ECG was

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done by a technician and the record was reported as showing atrial fibrillation/flutter with ventricular rate at around 60 beats/min by another junior cardiologist who did not see the patient. The patient returned to the clinic one month later to see the results of ECG examination. The attending cardiologist saw the ECG record and revised the ECG report by substituting involuntary movement for atrial fibrillation/flutter.

On close examination, the sawtooth flutter waves were most prominent in leads II, III and aVF and showed a frequency of 4 Hz on the ECG paper, which is compatible with the frequency of her Parkinson's tremor. The presence of discrete P wave (white arrow) and unstable baseline on the lead II rhythm strip before and after the normal P and QRS complex also argued against a diagnosis of atrial fibrillation/flutter. Tremor-induced electrocardiographic artifact mimicking atrial flutter⁽¹⁾ or ventricular tachycardia⁽²⁻³⁾ had been occasionally reported before. Even a board-certified cardiologist may make a mistake and interprets the motion-related artifacts as cardiac arrhythmia⁽²⁾. The misinterpretation may cause unnecessary and potentially harmful diagnostic work-up and treatment⁽²⁾.

In routine clinical practice, the ECG was usually done by a technician or intern and interpreted by a resident or cardiologist other than the ordering physician. To avoid a misinterpretation, the technician or the intern should have the knowledge of motion-related ECG artifacts and know the way to eliminate them (e.g. holding the tremulous limb in PD⁽¹⁾). This report emphasized the clinical importance that the ordering physician should provide adequate and sufficient information for the staffs who did the examination or interpreted the examination for a patient. In interpreting the data of electrophysiological studies (e.g. ECG, electroencephalogram) or images, the interpreters should keep the possibility of motion-related artifacts in mind.

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