

## Pseudo-atrial flutter: Parkinson tremor

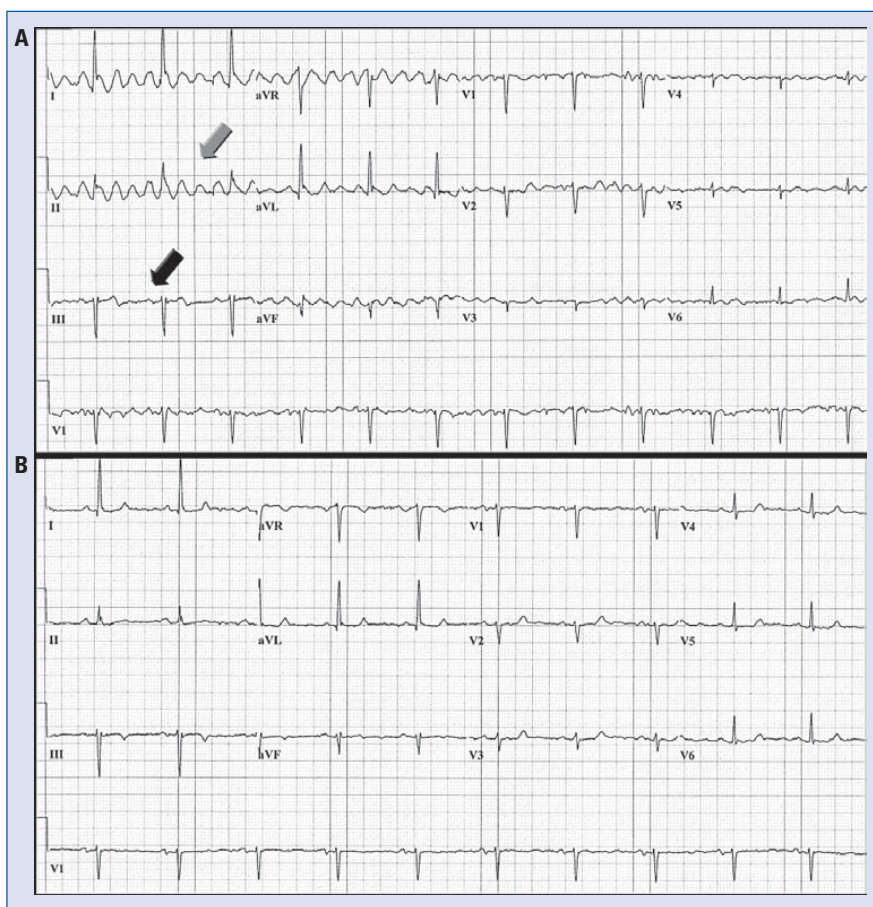
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### Electrocardiogram description

This 12-lead electrocardiogram (ECG) is of a 69 year-old man with Parkinson's disease. On initial inspection, the rhythm appears to be that of atrial

flutter, with negatively directed flutter waves in the inferior leads (Fig. 1A, grey arrow), consistent with cavo-tricuspid isthmus dependent flutter. These waves present a cycle length of approximately 200 ms and are best visualized in leads I, II, aVR,



**Figure 1. A.** 12-lead electrocardiogram (ECG) of a patient with Parkinson's disease. Note 'pseudo-flutter waves' in the inferior leads with a cycle length of 200 ms. In lead III, normal P-waves are seen, thus orienting the diagnosis to tremor-induced artifact; **B.** 12-lead ECG of the same patient. Note the disappearance of the tremor-induced pseudo-flutter waves caused by placing the limb leads closer to the torso.

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aVL and aVF. Upon closer inspection of the ECG, normal sinus rhythm can be noted, and is best seen in lead III (Fig. 1A, black arrow).

This finding suggests that the suspected waves are in fact related to a Parkinsonian tremor. The absence of 'pseudo-flutter' waves in lead III suggests that the left arm is **not** involved in the tremor. Normal sinus rhythm is clearly identified by placing the limb leads closer to the torso (Fig. 1B). The rest of the ECG depicts normal PR interval, QRS axis approximately in  $-10^\circ$  and normal QRS and QT interval.

### Points to ponder

Tremor-induced artifact may mimic supraventricular arrhythmias (atrial flutter or atrial fibrillation). Or if the artifact has sufficient amplitude, the tracings could be misinterpreted as ventricular tachycardia or ventricular fibrillation [1].

The correct diagnosis can be made based on simple observations such as the 'pseudo-arrhythmia' occurring only during patient movement (tremor). Upon careful inspection of the leads in which the artifact is not observed (lead III in the presented case), the P-wave morphology is uniform, regular and constant in rate; a clue that artifact is present (Fig. 1A, black arrow) [2–4]. Misinterpretation of

tremor-induced artifact may lead to serious medical errors such as the initiation of long-term anticoagulation for 'pseudo-atrial fibrillation' [5]. In our case, 'pseudo-atrial flutter' can be seen as a consequence of Parkinson's tremor-induced artifact. The pseudo-flutter waves disappear when the limb electrodes are placed closer to the torso.

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### References

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