Uncommon cause for a common electrocardiographic artifact

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A 61-year-old man with atypical chest pain and a previous abnormal stress echocardiography was referred to the Peter Munk Cardiac Centre (Toronto, Ontario) for diagnostic coronary angiography.

On the day of his admission, a nurse tried to obtain a high-quality electrocardiogram (ECG) but failed despite several attempts at replacing and repositioning the ECG electrodes (Figure 1A). On questioning, the patient indicated that he had had a deep brain stimulator implanted for generalized dystonia four years earlier (Figure 1B). He finally offered to suppress the stimulator output with a remote control device, which allowed for an ECG with acceptable quality to be obtained (Figure 1C).

Causes of electrical artifacts on ECGs are manifold. External artifacts are usually caused by line current, which has a frequency of

50 Hz or 60 Hz. Internal electrical artifacts can be caused by tremors, muscle shivering, hiccups or, as in the present case, medical devices. Deep brain stimulators usually have a stimulation frequency between 100 Hz and 160 Hz, which leads to ECG artifacts not distinguishable from line current artifacts by the bare eye. Bipolar stimulation may cause fewer artifacts than unipolar stimulation. Turning the device off while obtaining an ECG may cause recurrence of the underlying tremor, which by itself can hamper ECG quality.

The present case illustrates that it is important to identify the source of ECG artifacts, because only its identification will allow for optimization of ECG quality.

Figure 1

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