

# Delayed diagnosis of myocardial infarction due to deep brain stimulation

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Dear Editor,

We report the case of a patient in whom diagnosis of myocardial infarction was delayed because of deep brain stimulation (DBS). To our knowledge, this is the first case reported in the literature.

Increasing numbers of DBS devices are implanted worldwide for various indications. DBS seems to be compatible with cardiac pacemakers (1) and with routine electrocardiogram (ECG) (3). Because of stimulation artifacts, routine ECG is usually performed with stimulators turned off. ECG tracings with stimulators turned on may cause problems with ECG readings (2, 3). In emergency situations interference of stimulation artifacts with ECG readings may cause significant problems if the stimulation cannot be turned off in time. To illustrate such potential problems, we present the following case.

## Case Report

A 65-year-old woman was admitted to the emergency room 1 h after the onset of severe substernal chest pain. Her prior history was remarkable for arterial hypertension, cigarette smoking and DBS for essential tremor with a left-sided thalamic lead in the V.im and a left-sided infraclavicular neurostimulator (Activa RC, Medtronic). The DBS electrode had been implanted 11 years ago, and the left-sided infraclavicular neurostimulator had been replaced 8 months

ago. Neurostimulation was currently set to a monopolar setting with the V.im-lead set to negative and the case of the neurostimulator set to positive. On admission, physical examination revealed tachypnea, diaphoresis, a blood pressure of 148/85 mmHg and a heart rate of 100 bpm. Auscultation was nondiagnostic. Despite proper handling, printing of the ECG was withheld by the electrocardiograph for failure to detect a stable baseline. To document the ECG, a screen shot was taken with a mobile phone camera (Fig. 1). The ECG could not be interpreted because of the artifacts from neurostimulation. The neurostimulator did not respond to application of an external magnet. No dedicated programming device was available in the emergency room to switch off stimulation. The patient's condition deteriorated, and pain was now strongest in the back. An emergency CT scan of the thorax was performed, and aortic dissection was ruled out. Minutes later, stimulation was switched off by the neurosurgeon with a dedicated programming device. The ECG now revealed anterior ST segment elevation indicating myocardial infarction. The patient was transferred to the catheter laboratory immediately and underwent successful percutaneous coronary intervention for the occluded left anterior descending coronary artery (LAD). Although diagnosis was delayed by 1 h, the patient recovered well with only mild left ventricular dysfunction. A later review of the CT scan revealed proximal LAD occlusion and hypoperfusion of the left ventricular septum and apex, which was missed on the initial reading.

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## Discussion

DBS may use monopolar or bipolar stimulation settings. In monopolar DBS, deep brain contacts are set against the case of the neurostimulator for superior clinical effects. The resulting stimulation artifacts in patients with monopolar