CASE REPORT

Parkinson’s tremor mimicking ventricular tachycardia

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Abstract

We report the case of an elderly lady with Parkinson’s tremor whose electrocardiographic (ECG) appearance simulated ventricular tachycardia. As a result she underwent unnecessary clinical intervention. We also highlight the difficulty in correctly identifying a tremor-induced ECG artefact with regard to Parkinson’s disease, due to the diverse range of possible clinical scenarios presented by patients with this condition.

Keywords: ventricular tachycardia, electrocardiograph, tremor, Parkinson’s, elderly

Introduction

Ventricular tachycardia (VT) is a life-threatening condition and it is important to recognise it quickly and treat it effectively, even in a patient without haemodynamic compromise [1]. However, electrocardiographic (ECG) artefact can simulate ventricular tachycardia and give rise to unwarranted further investigations and treatment [2]. We report a case of Parkinson’s tremor mimicking VT which led to unnecessary clinical intervention.

Case report

An 82-year-old woman with Parkinson’s disease underwent a routine pre-operative ECG for a cataract extraction. She had no prior history of heart disease and had never previously suffered with dizzy spells, although she had experienced occasional episodes of non-disabling short-lived palpitations. Her medication consisted of a dopamine agonist and a diuretic. She was alert and responsive whilst the recording (Figure 1) was taken.

A subsequent ECG recorded 1 minute later showed normal QRS complexes with a slightly erratic baseline (Figure 2, available as supplementary data on the journal website www.ageing.oupjournals.org). On the basis of the first ECG, she was admitted to the coronary care unit for cardiac monitoring. Routine biochemistry showed no abnormality and she was commenced on oral amiodarone. Her operation was cancelled pending further investigations. An in-patient echocardiogram showed good left ventricular function with no structural heart disease. A two lead channel recording the next day (Figure 3, available as supplementary data) confirmed that the VT was artefactual and was due to electrical spikes at approximately 5Hz, which is similar to the Parkinson’s tremor of between 4 and 6Hz. A closer inspection of lead V3 from the original ECG (Figure 4, available as supplementary data) shows myocardial ventricular potentials superimposed on the muscular tremor potentials of Parkinson’s disease. She was asymptomatic throughout her brief hospital stay and amiodarone was discontinued. She was subsequently discharged and later underwent her postponed cataract extraction without complication.

Discussion

The tremor of Parkinson’s disease has been known to induce ECG artefacts resembling cardiac arrhythmias for around 35 years, simulating both atrial and ventricular tachyarrhythmias [3, 4–6]. Knight et al. [2] published an interesting case-series review on the clinical consequences of misdiagnosing ECG artefact as VT in 12 patients, of whom nine were asymptomatic at the time of the ECG recording. Although the actual cause of each patient’s electrocardiographic artefact mimicking VT was not determined, the clinical consequences were profound. These ranged from the delivery of a precordial thump, administration of anti-arrhythmics, diagnostic cardiac catheterisation, and even placement of an implantable cardioverter defibrillator in one patient. Interestingly, in four of the cases, the initial diagnosis was made by a cardiologist; and in 10 out of the 12 cases, the electrocardiographs were reviewed by a cardiologist who agreed with the diagnosis. The difficulty in reaching a correct diagnosis, even for experienced physicians, was...
further highlighted by a large study of 766 doctors conducted in the USA [7]. This revealed that 58% of cardiologists and 38% of electrophysiologists failed correctly to recognise ECG artefact resembling a wide complex tachycardia, and the majority of them recommended subsequent invasive procedures for further evaluation or therapy.

Apart from the tremor of Parkinson’s disease which may mimic VT, its associated symptoms too can support the misdiagnosis. Llinas et al. [8] reported a case of an elderly patient with Parkinson’s who presented with a history of collapses. ‘VT’ on her ECG was thought to be the cause but in fact her falls were related to the postural instability associated with Parkinson’s disease. Furthermore, the dopamine agonists used in treating Parkinson’s disease frequently cause postural hypotension, which also increases the likelihood of falls. Interestingly, patients with Parkinson’s disease may also suffer from cardiovascular autonomic dysfunction [9, 10, 11], which can cause QT prolongation [12] and lead to ventricular arrhythmias and sudden death [13, 14]. This may also be enhanced to various extents by different antiparkinsonian drugs [15]. Therefore dismissing ‘VT’ on the ECG as tremor-induced artefact may not be as straightforward in view of the diverse range of possible clinical scenarios presented by patients with Parkinson’s disease. Possible methods of clarifying the diagnosis in an asymptomatic patient include careful review of the temporal relation of body movement to the ECG recording, close scrutiny of the ECG trace looking for normal QRS complexes within the artefact [16], eliciting physical signs of atrio-ventricular dissociation such as variability of the jugular venous pulse amplitude or loudness of the first heart sound [17], as well as the use of transoesophageal ECG recording for complex cases [1, 18, 19].

This case report highlights the difficulty in correctly identifying a tremor-induced ECG artefact, when faced with a potentially life-threatening condition. It also serves to illustrate the unnecessary and inappropriate clinical intervention that arises from such a misdiagnosis, which emphasises the importance of increased training and awareness in diagnosing serious cardiac arrhythmias.

**Key points**

- Parkinson’s tremor can simulate ventricular or atrial tachyarrhythmias on an ECG.
- Misdiagnosis of tremor-induced ECG artefact often leads to unnecessary and inappropriate clinical intervention.
- Close scrutiny of an ECG trace is paramount when diagnosing serious cardiac arrhythmias.

**Conflicts of interest**

None declared.

**Acknowledgement**

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**Please note**

The long list of references supporting this article has meant that only the most important are listed here and are represented by bold type throughout the text. The full list of references is available on the journal website (www.ageing.oupjournals.org) as Appendix 1.

**References**


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