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Case Report

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Extreme QT prolongation in elderly women after non-ST elevation myocardial infarct

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Abstract

This is a brief report of three cases of non-ST elevation myocardial infarction presenting with giant T wave inversion and prolonged QT interval. Searching the medical literature revealed a handful of similar cases. There were quite a few common characteristics among these cases suggesting an uncommon but distinctive presentation.

Keywords

NSTEMI, QT prolongation, severe coronary artery disease, elderly women

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This is a report of three elderly female patients with non-ST elevation myocardial infarction (NSTEMI) with giant T wave inversion and severe QT prolongation. Their ECG manifestations were very similar. The initial ECG at presentation showed some T wave inversion, but over 24–48 hours they developed large T wave inversion with significant QT prolongation. All of them were pain free when giant T wave inversion and maximal QT prolongation were noted on ECG. There was no ventricular arrhythmia while they were in hospital. The QT interval improved slowly over days during their hospital stay. There was no overt cause of QT prolongation (drugs, electrolytes, etc.). Their resting ECG in the past (obtained from hospital records) showed the QT interval was normal. One of them had a coronary angiogram, which showed severe left main stem disease. In the other two patients coronary angiogram was not performed because of comorbidities and frailties, and it was decided to treat them medically in the first instance.

Case no. 1

A 94-year-old woman with no history of ischaemic heart disease (IHD) presented with collapse and chest pain, hs troponin T 281 (normal <14), treated medically, coronary angiogram was not performed. Maximum corrected QT interval was 590 mseconds (see Figures 1 and 2).

Case no. 2

A 100-year-old woman presented with chest pain, hs troponin T 345 (normal <14), treated medically, coronary angiogram was not performed. No history of IHD in the past. Maximum corrected QT interval was 535 mseconds (see Figure 3).

Case no. 3

An 84-year-old woman with no history of IHD presented with chest pain, coronary angiogram showed severe left main stem disease, hs troponin T 250. Maximum corrected QT interval was 650 mseconds.

Echocardiogram in all three cases (performed between 48 hours and 5 days after presentation) showed reasonably preserved left ventricular systolic function, with some regional wall motion abnormalities that were not specifically related to left anterior descending (LAD) coronary artery territory. There were no features suggestive of Takotsubo cardiomyopathy.

The patient with left main stenosis had coronary artery bypass grafting performed and the other two patients did not have any further admission in 3 months after the event.

The medical literature was searched for similar cases. Giant T wave inversion in a setting of acute coronary syndrome has been described in the past. In the era of thrombolysis, transient giant T wave inversion had been described

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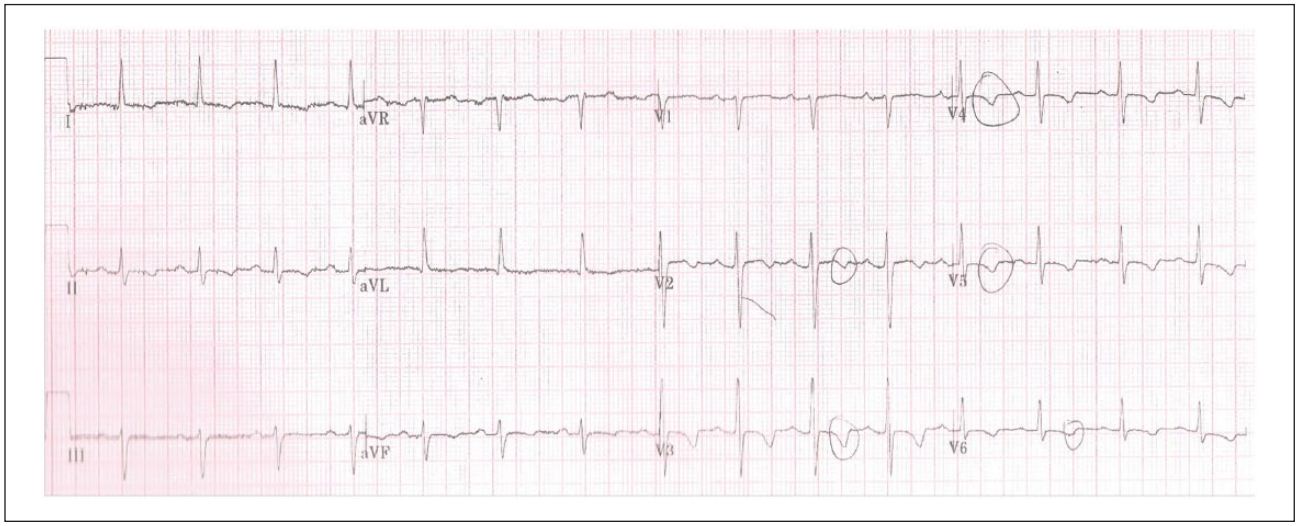

Figure 1. Case 1. ECG on the day of the event. Corrected QT 440 msec.

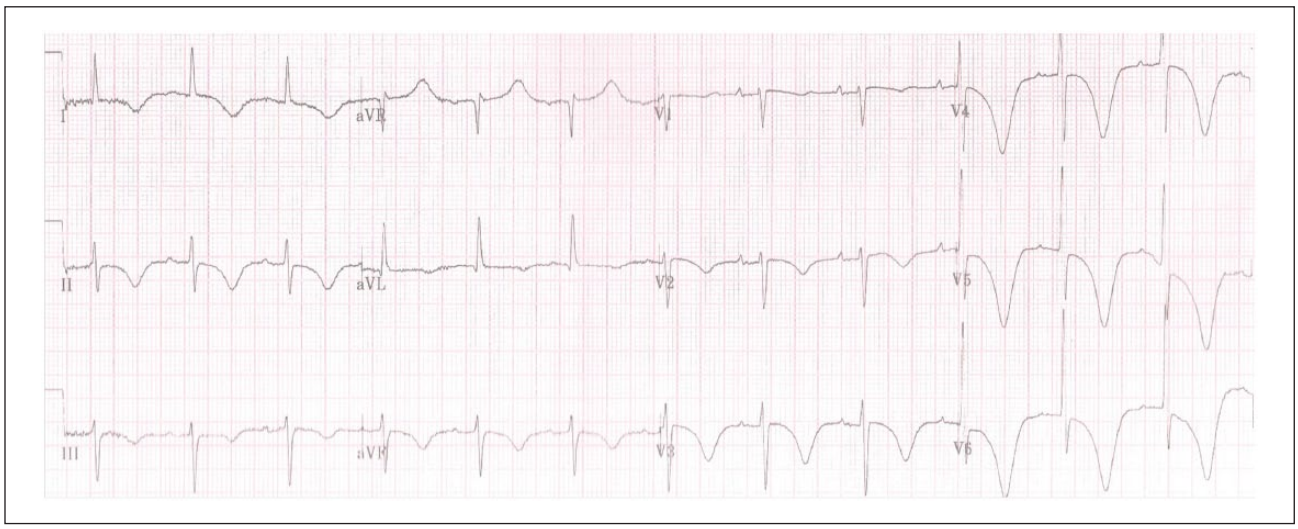

Figure 2. Case 1. ECG 1 day after the event. Corrected QT 590 msec.

after acute Q wave anterior wall myocardial infarction and was shown to be associated with better R wave recovery and preservation of left ventricular systolic function.[1] However, more recently there were at least three similar case reports of giant T waves and QT prolongation after NSTEMI.

1. An 84-year-old woman, coronary angiogram showed significant left main stem and proximal LAD disease. Maximum corrected QT interval was 680 mseconds. Published in *Circulation: Arrhythmia and Electrophysiology* in 2009.[2]
2. A 79-year-old woman, coronary angiogram showed significant proximal LAD disease. Maximum corrected QT interval was 745 mseconds. Published in *Revista Espanola de Cardiologia* in 2012.[3]
3. A 57-year-old woman, coronary angiogram showed significant stenosis in LAD and left circumflex arteries (clinical cardiology). Maximum corrected QT interval was 780 mseconds. Published in *Clinical Cardiology* in 2001.[4]

Some common features were noted among these six cases (three already reported as mentioned above and three reported in this communication):

- They are all NSTEMI, first presentation of IHD.
- All of them are women, five of them are elderly.
- Initially small ECG changes were seen and these then progressed to deep T wave inversion, extreme QT prolongation.
- Significant coronary artery disease was present involving left main/LAD artery (although two patients did not have coronary angiogram).
- QT interval gradually improves with medical treatment and/or revascularization.

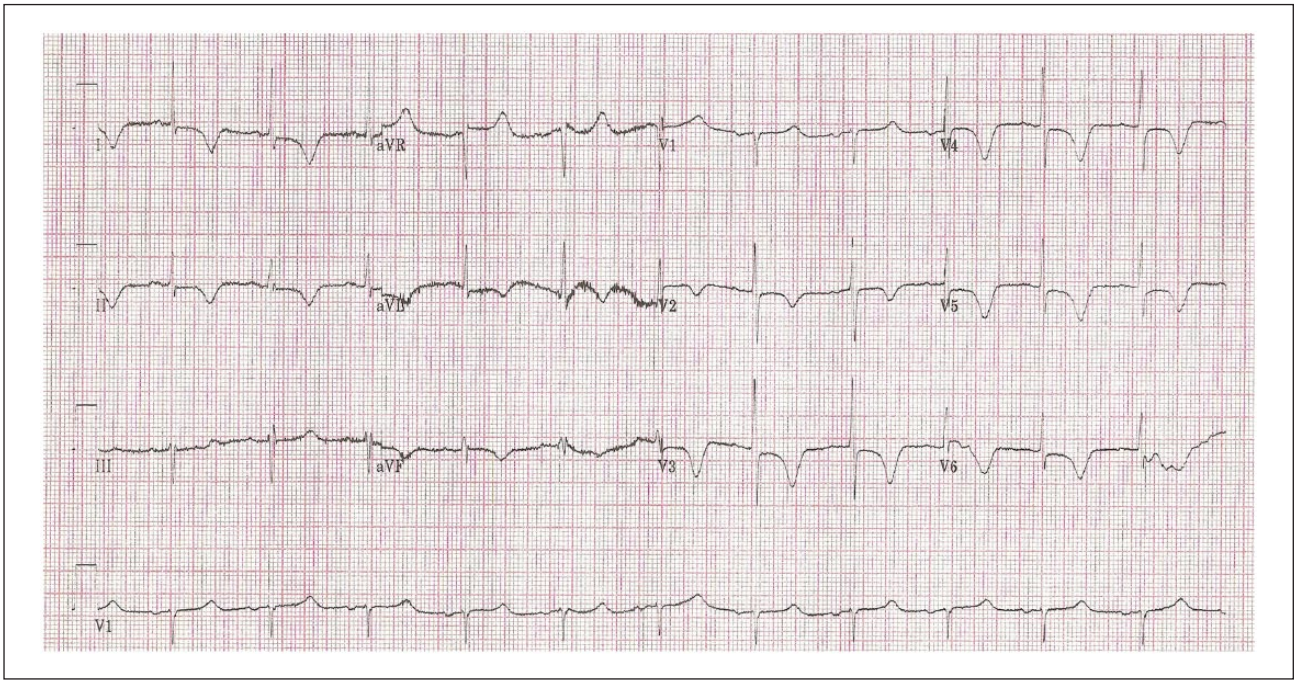

Figure 3. Case 2. ECG on the day of the event. Corrected QT 535 msec.

- Ventricular arrhythmia is uncommon although there was some torsade de pointes in one case.[3]

This is an uncommon ECG presentation of NSTEMI. Biphasic T wave as well as T wave inversion in chest leads have been well described in an unstable angina/NSTEMI setting and they have been noted to correlate with critical LAD lesions.[5] However, in the above case series inverted T waves were giant and they were associated with significantly prolonged QT intervals.

Although here ischaemia is causally related to giant T wave inversion and QT prolongation it is difficult to know the exact mechanism. Giant T wave inversion and long QT interval have traditionally been thought to be an indicator of reperfusion injury and stunning of the myocardium,[6] but giant T wave inversion and QT prolongation has also been described in a setting of cardiogenic but non-ischaemic pulmonary oedema.[7] It is thought that a differential response of the epicardium and endocardium to various factors such as ischaemia, hypoxia and metabolic changes during acute events can cause dispersion in repolarisation, and this leads to a significant ventricular gradient producing giant T wave changes and prolonged QT intervals.[7] It is hard to know whether genetic predisposition, age, sex or the extent/pattern of ischaemia have got anything to do with this particular uncommon presentation.

Conflict of interest

None declared.

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