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Case Report

CASE REPORT

Two cases of acute chest discomfort and the Central Italy earthquake

Giuseppe Pannarale*, Concetta Torromeo, Maria Cristina Acconcia, Andrea Moretti, Valentina De Angelis, Alessandra Tanzilli, Vincenzo Paravati, Francesco Barillà and Carlo Gaudio

Dipartimento Cuore e Grossi Vasi, Sapienza Università di Roma, Rome, Italy

*Correspondence address. Dipartimento Cuore e Grossi Vasi, Sapienza Università di Roma, Viale del Policlinico 155, 00161 Rome, Italy, Tel: +39-064-497-2650; E-mail: gpann@libero.it

Abstract

We present the cases of two postmenopausal women presenting to our emergency department with acute chest discomfort soon after the Central Italy earthquake. Different diagnoses were made in the two patients. The role of the earthquake as a stressful event triggering diverse chest pain syndromes is discussed.

INTRODUCTION

Takotsubo cardiomyopathy is a recently recognized cardiomyopathy, with acute onset and peculiar left ventricular (LV) wall motion abnormalities consisting in LV apical ballooning not related to acute coronary artery obstruction [1]. However, at presentation it resembles an acute coronary syndrome with similar ECG changes and elevation of myocardial necrosis markers. It is generally observed in postmenopausal women and it is often triggered by a stressful event, which can be either physical or emotional. Probably the myocardial stunning is related to an excessive catecholamine incretion [2].

On the other hand, also acute coronary syndromes can be linked to stressful events, as in the occasion of Christchurch earthquake, when both myocardial infarction and stress cardiomyopathy were diagnosed in a large number of patients with chest pain precipitated by the earthquake [3].

On August 24, 2016 a major earthquake, which registered 6.0 on the Richter scale at 3.36 a.m., occurred in Central Italy. Its epicentre was close to Accumoli, a town located about 110 km northeast of Rome with its hypocentre at a depth of 4 ± 1 km. Severe damage occurred in the town of Amatrice, near the epicentre, in Accumoli and Pescara del Tronto. The earthquake caused the death of 292 people: 232 in Amatrice, 11 in Accumoli and 49 in Arquata del Tronto.

We describe two cases of acute cardiovascular events, which may have been triggered by this natural disaster: a takotsubo cardiomyopathy and a non-ST elevation myocardial infarction (NSTEMI).

CASE REPORTS

Case No. 1

A 77-year-old Caucasian woman living in Amatrice experienced chest tightness associated with severe dyspnea and nausea about one and a half hours after the first earth tremor (5 a.m.). She was admitted to the emergency department (ED) of our hospital at 3.15 p.m. No history of cardiovascular risk factors. At presentation, vital signs were the following: pulse 104 beats/min in sinus rhythm, blood pressure (BP) 150/90 mmHg, body temperature (BT) 36.5°C, respiratory rate (RR) 30 breaths/min, oxygen saturation 96%.

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ECG revealed sinus tachycardia with a left bundle branch block, already known.

The plasma concentration of the troponin T was 0.4 μg/L (normal values < 0.014 μg/L).

She was referred to our Cardiac Intensive Care Unit (CICU). Echocardiography revealed apical akinesia with relatively preserved LV basal wall motion, and the LV ejection fraction (LVEF) was 37%. The patient underwent coronary angiography, which revealed no significant coronary artery stenosis. However, LV angiography revealed apical akinesia, with a slightly increased basal and middle contractility (Fig. 1).

According to these findings, the diagnosis of takotsubo cardiomyopathy was made.

The patient was prescribed a dual antiplatelet therapy (aspirin 100 mg and clopidogrel 75 mg daily), a β-blocker (bisoprolol 1.25 mg daily) and ranolazine 375 mg twice a day. Clopidogrel was discontinued ten days later.

One week after the admission a second echocardiogram showed an improved LVEF (50%) with apical and periapical hypokinesia.

No complications occurred during the in-hospital stay and the patient was discharged after 9 days.

Case No. 2

A 76-year-old Caucasian woman, living in Rome, 133 km from Amatrice, with a past medical history of essential hypertension, type II diabetes mellitus and smoking habit (60 pack years), experienced oppressive substernal chest pain radiated to the left arm, dyspnea, nausea and cold sweating a few minutes after the earthquake. Symptoms temporarily remitted after taking ketoprofen 50 mg orally. She went to the ED of our hospital at 10.00 p.m., about 18 h after the onset of earthquake tremors.

At the admission, vital signs were the following: BP 140/60 mmHg, pulse 61 beats/min in sinus rhythm, BT 36°C, RR 18 breaths/min, oxygen saturation 99%.

ECG documented T wave inversion in I and aVL. The first blood tests showed troponin T 0.454 μg/L (normal values < 0.014 μg/L). She was referred to our CICU with the diagnosis of NSTEMI. Echocardiography revealed LV hypokinesia of basal inferior wall and inferior septum; LVEF was slightly reduced (48%).

Coronary angiography, performed in the morning after, showed a subocclusive stenosis of the mid and distal right coronary artery that was stented with two drug-eluting stents.

The patient had no in-hospital complications and was discharged one week later with the following treatment: aspirin 100 mg daily, clopidogrel 75 mg daily, atorvastatin 40 mg daily, ranolazine 375 mg twice a day, bisoprolol 1.25 mg daily and ramipril 2.5 mg daily.

After 12 days a second echocardiography revealed a mild improvement of LVEF (53%) with a persistent hypokinesia.

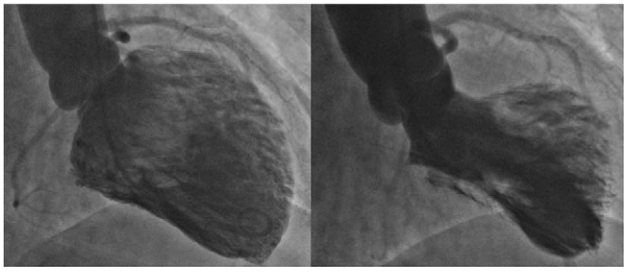

Figure 1: left ventricular angiography in diastole (left) and systole (right) of Case No. 1.

DISCUSSION

Major stressful events such as natural disasters can trigger acute cardiovascular disorders through physical and mental stresses [4, 5]. The enhanced sympathetic activity caused by natural catastrophes would play a role in elevating both BP and heart rate [6], as showed by the analysis of time- and frequency-domains of heart rate variability performed in patients wearing 24-h Holter ECG monitors during the Taiwan 1999 earthquake [7].

Moreover, in 2013 Chan *et al.* [3] underlined the time frame linkage between earthquakes and the occurrence of acute myocardial infarction (AMI) and stress cardiomyopathy. Tanaka *et al.* [8] showed a peak of AMI cases within the first week after the 2011 northeast Japan earthquake. The incidence of AMI was positively correlated with the seismic scale of the earthquake.

Even if the onset of the NSTEMI we described in Case No. 2 had a time relationship with the earthquake tremors, this time relationship does not necessarily demonstrate causality, since that NSTEMI is relatively common cardiovascular disorder.

To the best of our knowledge, it is currently unclear how the same stressful event could trigger different kind of acute cardiovascular disease. This difference could probably relate to the cardiovascular risk profile of each patient.

In high-risk cardiovascular patients, if coronary artery disease is present, stressful situations, such as earthquakes and blizzards, may precipitate acute coronary syndromes; on the other hand, in subjects free of coronary disease, acute psychological stress or psychiatric disorders may induce takotsubo cardiomyopathy [9].

Our Case No. 1, who was diagnosed a takotsubo stress cardiomyopathy, had a pre-existent LBBB without reported cardiovascular disorders and, in fact, the only abnormalities we found were related to the takotsubo syndrome itself. This is not remarkable since that Rowlands [10], who summarized the follow-up data from many studies concerning intraventricular conduction defects, concluded that mortality risk in pre-existent LBBB without overt cardiac disease is only 1.3.

CONFLICT OF INTERESTS STATEMENT

None declared.

FUNDING

No funding.

ETHICAL APPROVAL

No ethical approval is requested by our institution to publish case reports of unidentifiable patients.

CONSENT

All the patients in our institution sign an informed consent to all diagnostic and operative procedures. The information derived from such procedures is made available to the medical staff for scientific purposes. No identifying information should be reported.

The case reports in the present article are not identifiable.

GUARANTOR

Giuseppe Pannarale, M.D., the corresponding author, was nominated guarantor for this article.

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