Tako-Tsubo syndrome in a pregnant woman

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Received 31 December 2007; accepted after revision 2 March 2008; online publish-ahead-of-print 4 April 2008

We describe a rare case of Tako-Tsubo syndrome which occurred in a young woman at the beginning of pregnancy, who presented cardiac arrest at onset. In this case, the transient left ventricular ballooning involving both mid and apical segments, in absence of coronary artery disease, produced a severe impairment of cardiac function with typical echocardiographic and electrocardiographic findings. The favourable outcome, despite the sudden cardiac death at the beginning, raises further questions on this new kind of cardiomyopathy.

KEYWORDS
Tako-Tsubo Syndrome; Pregnancy; Sudden cardiac death; Echocardiography

Tako-Tsubo Syndrome (TTS),1 apical ballooning syndrome,2–3 or stress cardiomyopathy4 are now frequently reported in international scientific literature to describe an example of transient stunned myocardium which tends to appears, with some exception, in post-menopausal women, soon after a psychic and/or physic stress. This condition lasts for a few days, sometimes recurs, and generally has a good prognosis.5,6

We report the case of a 32 years old woman in her fifth week of pregnancy. Her history cites a spontaneous pneumothorax 10 years earlier and some episodes of not specific tachycardia. Normal heart dimensions and function (Ejection Fraction EF = 71%) and an interatrial septum aneurysm were observed in an echocardiogram (ECHO) performed 3 years before. In the few days before she felt stressed (because of family quarrels and with the fear that her job in the radionuclide field could damage the foetus) very tired and had stomachache. Her morning sleep was interrupted by a sudden cardio-respiratory arrest, and she was immediately assisted by her husband, a trained nurse. A few minutes later the ventricular fibrillation (VF) was cardioverted to sinus rhythm with 2 DC shocks, and shortly after a second ventricular tachycardia promptly degenerated to VF was treated with 3 DC shocks (Figure 1). ABLS maneuvers and step-by-step adrenaline was performed accordingly to guidelines. Total time from the first VF to the stable sinus rhythm was 25 min.

In the intensive care unit, she suffered hypotension and diuresis reduction, without significant electrocardiographic (ECG) anomalies (Figure 2A), improved after iv injection of amine (continuous infusion of dobutamine at 6 γ/kg/min), plasma expander and levosimendan (at 0.08 γ/kg/min). After intubation, the blood gas analysis showed normal values.

Lung perfusion scintigraphy, coronary (Figure 3A and B), aortic, and pulmonary angiography were normal the first day, while anterior and apical left ventricular (LV) wall motion dysfunction was observed at left ventriculography.

LV dysfunction typical of TTS was evident at an ECHO performed 24 h later by portable machine (Esioet, My Lab 25, Firenne, Italy). All mid-apical segments of a not dilated LV were akinetic (the 2/3 of whole LV) (Supplementary material online, Video S1 and 2); they appeared as being separated by a short axis plane perpendicular to the long axis (Figure 4). The interatrial septum aneurysm was confirmed; the mitral valve showed mild regurgitation without evidence of systolic anterior movement; LV outflow tract obstruction was not observed. Although medical therapy still included amines at high dosage, EF was still depressed (22%) and CO was only 2.1 L/m.

During the following days the patient showed a progress and on the sixth day she breathed spontaneously after extubation.

The cardiac injury enzyme markers appeared to be increased, but not proportional to the initial LV dysfunction (Figure 5). Serial ECGs evolved with a normalization of the QTc interval, which was initially prolonged (630 ms at third day. Figure 6), and with the appearance of diffuse deep negative T waves (Figure 2B). Continuous ECG monitoring did not record further ventricular arrhythmias.
Figure 1  ECG records of VF and VT obtained by AED monitor.

Figure 2  (A and B) First ECG in ICU, no ST-segment elevation. (B) ECG with abnormal repolarization.

Figure 3  (A) Normal right coronary artery. (B) Normal left coronary artery.
Serial ECHOs documented transient LV dysfunction with EF >50% already in the ninth day, without infusion of inotropic agents. 2D strain and 2D velocity ECHO imaging proved to be feasible and to parallel the cardiac wall motion recovery, even with a more evident aspect (Figure 7A and B at third day).

We also observed the vectors of myocardial velocity and the related curves increase with time in the mid-apical segments of LV. Also the shape of LV returned to normal day-by-day (Supplementary material online, Video S3 and 4). The M-mode colour coding pictures of Velocity-Stain per cent and SR easily documented both systolic and diastolic functional improvement (Figure 8A and B on the 13th day). Unfortunately, the woman suffered a spontaneous abortion 10 days after her VF, while in the coronary care unit, but there were no neuropsychiatric consequences after her discharge, except for a slight depressive syndrome.

Discussion

We consider this TTS report as particular for the following reasons: (i) it regards a young pregnant woman; a condition of stress is present without an individual event (the relationship between sexual hormones and TTS is still under investigation); (ii) the onset was with sudden cardiac death by VF (reverted after ABLS); (iii) it was sensitive to adrenaline; (iv) there was no ST-segment elevation on 12 leads ECG at 1st day.

Despite the favourable outcome of this case, several aspects of this new form of cardiomyopathy have to be taken into account. Probably sudden death is not so rare

![Figure 4](Top) 2D ECHO with a red line limiting the akinetic area, (bottom) 2D ECHO and endocardial velocity vectors.

![Figure 5](Cardiac injury markers curves.)

![Figure 6](QTc interval and heart rate curves.)
in the beginning of TTS; VF can occur on the basis of a severe LV impairment, but also it is possible that arrhythmia is related to the QTc interval prolongation during the early period of disease. The restoration of cardiac function is rapid, but the real prognosis is unclear. Adrenaline therapy (or others amine) in emergency conditions can play a role in the clinical setting.

Conclusions
Our report of rare and atypical TTS gives new information in understanding another aspect of this cardiomyopathy.

Supplementary material
Supplementary material is available at EJECHO online.

Conflict of interest: none declared.

References