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Takotsubo cardiomyopathy in pregnancy

Case Report

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Abstract: We have described a rare case of Takotsubo cardiomyopathy in pregnancy, which is presented with cardiac arrest (ventricular fibrillation) at onset. In this case, the transient left ventricular ballooning in absence of coronary artery disease, produced a severe impairment of cardiac function with typical echocardiographic and electrocardiographic findings. There were complications in the form of ventricular fibrillation, with recurrence due to possible Takotsubo cardiomyopathy and new malignant heart rhythm disorder that increases the mortality rate compared with the first attack of Takotsubo cardiomyopathy. Due to presented symptoms the patient has opted for the implantation of cardioverter defibrillator.

Keywords: *Takotsubo cardiomyopathy • Pregnancy • Ventricular fibrillation*

1. Introduction

Takotsubo cardiomyopathy (TCM) is described as a transient apical or midventricular dysfunction of the left ventricle in the absence of significant coronary disease and is caused by the emotional or physical stress [1].

Nowadays, generally accepted definition for this type of cardiomyopathy is that of the Mayo clinic [2-4], which states that Takotsubo cardiomyopathy is characterised by:

1. Electrocardiographic changes (ST-segment elevation and/or T-wave inversion).
2. Cardiac enzyme elevation.
3. Transient akinesis or dyskinesis of the left ventricular apical or midventricular myocardial segments.
4. Normal angiogram or absence of significant coronary artery stenosis.
5. Absence of recent head trauma, intracranial haemorrhage, pheochromocytoma, myocarditis, and hypertrophic cardiomyopathy.

The incidence of TCM is estimated at 1.7-2.2% of all patients hospitalised for acute myocardial infarction. Predominantly, it occurs in women in postmenopause, although there have been reported cases in younger women, as well as in men. Sudden death at the acute phase is estimated at around 1.1%. The exact pathophysiological mechanism has not yet been identified, possibly due to multifactorial nature of Takotsubo cardiomyopathy [2,3,5,6].

2. Case presentation

The patient was a 31-year-old woman in the 5th month of pregnancy who did not have prior cardiac problems. Previously, she had two miscarriages, and as a result was suffering from emotional stress. An hour prior to admittance to the hospital, while resting at home, she suddenly experienced a chest pain, followed by nausea and loss of consciousness. Ambulance was called; they performed an ECG that showed elevation of the ST-segment of anterolateral region (signs of acute anterolateral myocardial infarction) and it was decided that the patient should be transported to a medical facility, where

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necessary percutaneous coronary intervention can be performed (Figure 1). During the transport of patient in the ambulance vehicle, a rhythm disorder was noted along with ventricular fibrillation, and consequently she was defibrillated twice, after which sinus rhythm was restored (Figure 2).

Upon admittance in the intensive care unit, the patient was conscious, hemodynamically compensated and hypotensive, which was improved with continuous infusion of dobutamine and plasma expanders. ECG showed ST elevation of anterolateral region. Immediately after admission to the hospital, echocardiography

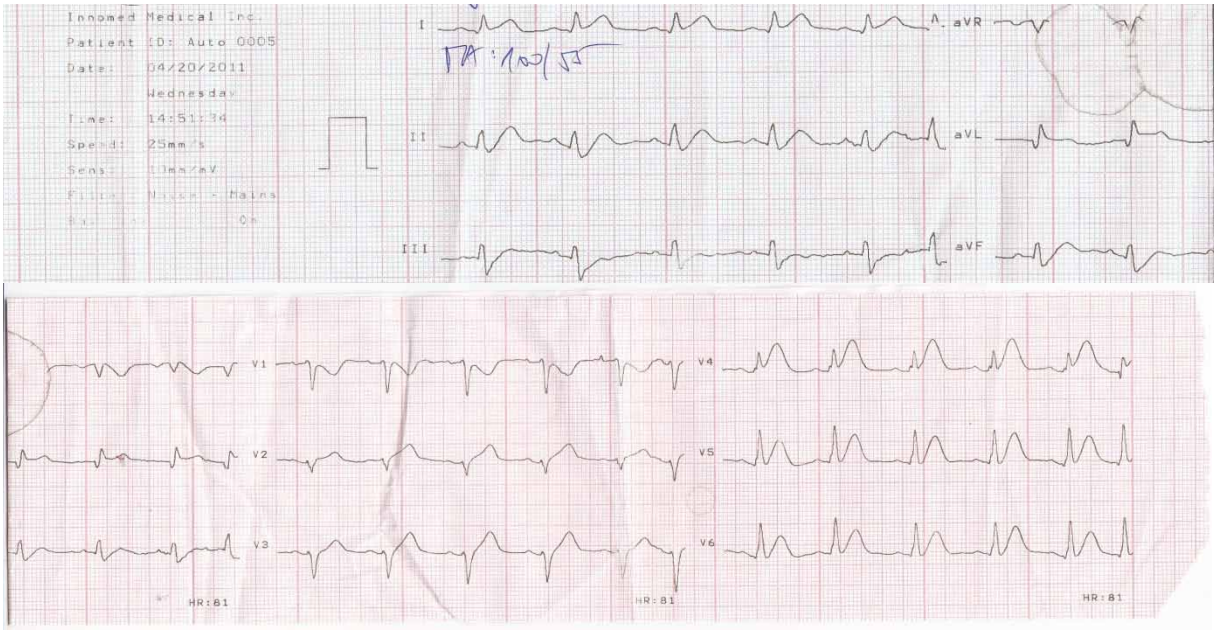

Figure 1. ECG traces of acute anterolateral myocardial infarction.

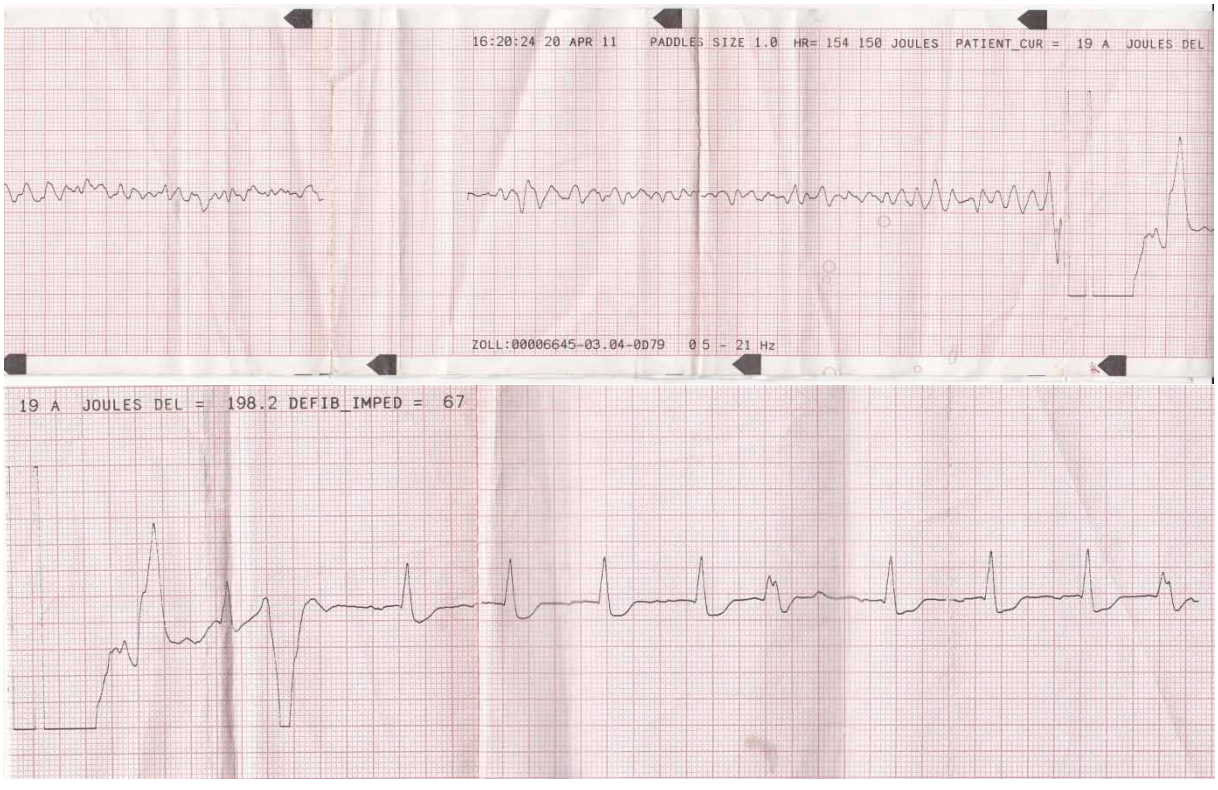

Figure 2. ECG tracing of ventricular fibrillation with a DC shock.

(GE Vivid 7) was performed showing left ventricle dysfunction typical of TCM, which was also evident 24 h later, when performed using a portable ECHO machine (GE Vivid 7). All mid-apical segments of non-dilated left ventricle were akinetic (the 2/3 of the whole left ventricle). The interatrial septum aneurysm was confirmed whereas the mitral valve has shown a mild regurgitation. Ejection fraction was depressed to 35-40% (Figure 3, 4).

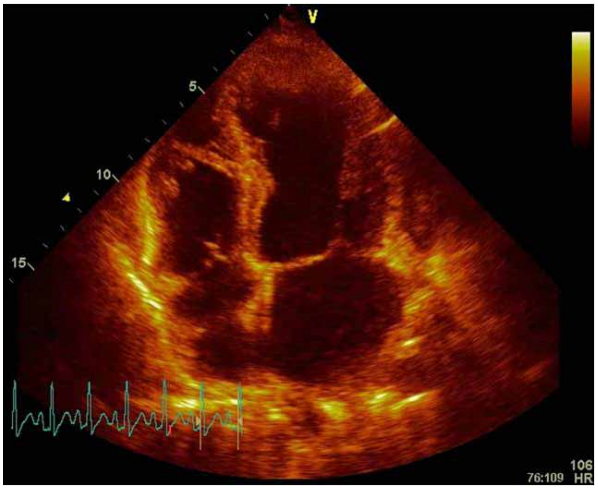

Figure 3. First echocardiographic examination.

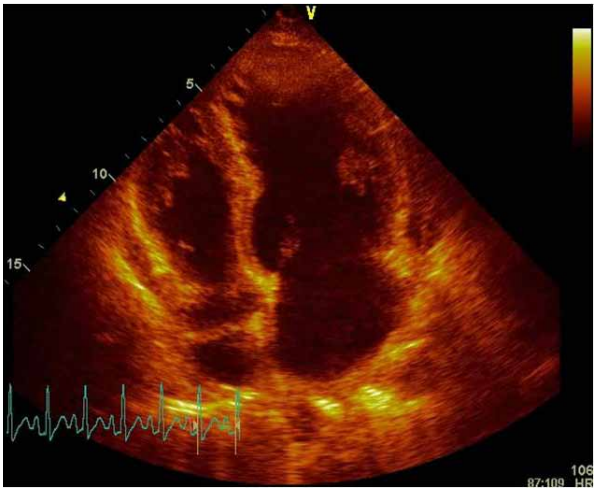

Figure 4. First echocardiographic examination.

It was decided to perform an urgent coronary angiogram, which showed normal coronary arteries (Figure 5, 6). Laboratory findings revealed the elevated levels of cardiac enzymes (troponin, myoglobin, creatine phosphokinase isoenzyme MB). During the following days the patient has showed progress. After the prescribed treatment, patient's condition has improved both subjectively and objectively, cardiac enzymes decreased; hence, the early rehabilitation period was initiated. Repeated echocardiography after 10 days has registered an improvement of left ventricular systolic

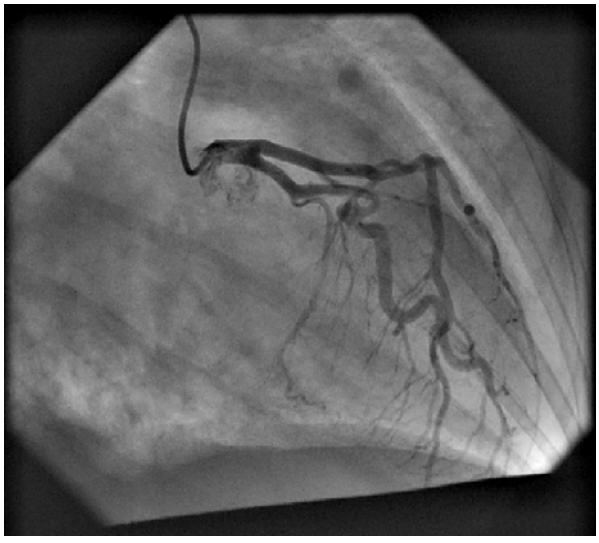

Figure 5. Normal coronary angiogram.

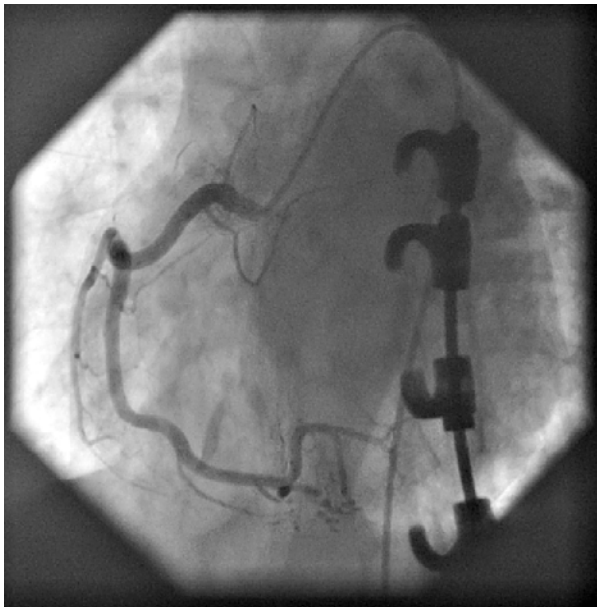

Figure 6. Normal coronary angiogram.

function (EF 55%) with mild hypokinesia of the apex (Figure 7). Serial ECGs showed regression of the ST elevation of anterolateral region (Figure 8). Continuous ECG monitoring did not record further ventricular arrhythmias. There were complications in the form of ventricular fibrillation, with recurrence due to possible Takotsubo cardiomyopathy and new malignant heart rhythm disorder that increased the mortality rate compared with the first attack of Takotsubo cardiomyopathy. Due to presented symptoms the patient has opted for the implantation of cardioverter defibrillator.

The patient was released home in good general condition, hemodynamically and rhythmically stable, while she was given beta-blockers for antiarrhythmic therapy.

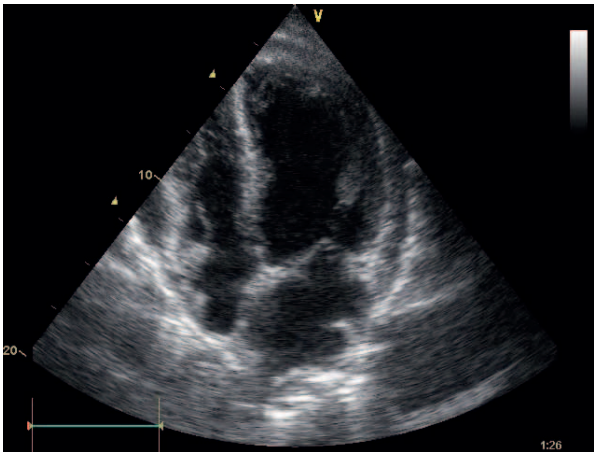

Figure 7. Follow-up echocardiographic examination.

The patient gave birth prematurely at a seventh month of pregnancy, to a healthy baby without any deformities. The baby was treated at the Children's Hospital, however, the baby has died after three months, as a consequence of infection.

3. Discussion

We consider this TCM report rather specific for the following reasons: it regards a young pregnant woman; a condition of stress is present without an individual event (the relationship between sexual hormones and TCM is still under investigation).

It may occur with the TCM to be the transient changes with minor or no organic myocardial damage. Reduced ejection fraction in the acute phase stabilises after a period of 7-27 days, and ST-segment changes after 43-400 days [7].

The treatment in the acute phase primarily involves the treatment of cardiac arrest, heart weakness and heart rhythm disorder. The duration of the acute phase and the duration of patient monitoring have not yet been determined; however, the normalisation of ejection fraction and ECG changes may serve as significant indicators.

The causes of heart rhythm disorder in Takotsubo cardiomyopathy are multiple. Ventricular heart rhythm disorders are the consequence of elevated catecholamine levels or increased cytosolic calcium concentration [4]. A prolonged QT interval is a common occurrence in this syndrome [4,8] which must surely be correlated with the registration of Torsades de pointes. The etiological differential diagnosis of a prolonged QT

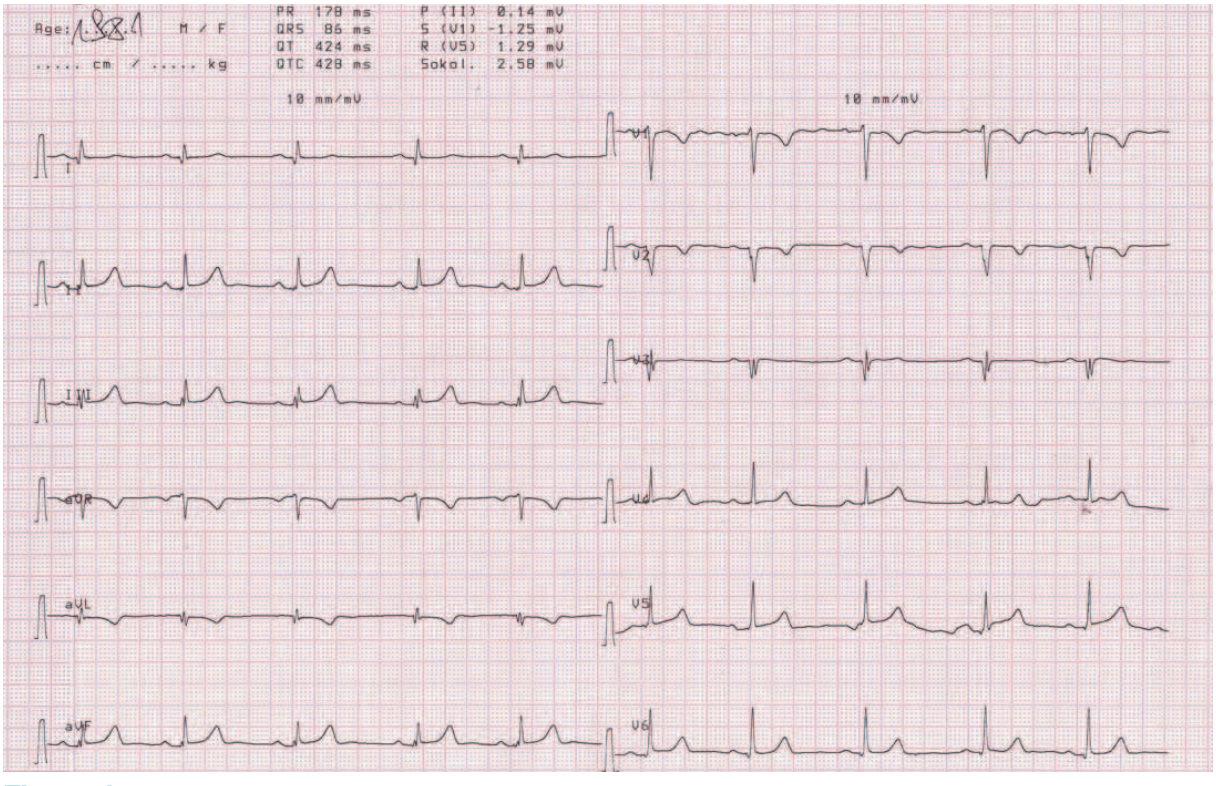

Figure 8. ECG showed regression of the ST elevation of the anterolateral region.

interval must always be examined: congenital long QT syndrome, bradycardia, hypokalemia, hypomagnesaemia, condition after cardioversion of AF, or application of drugs that prolong the QT interval (antiarrhythmics and others) [4,7].

The problem of secondary prevention has not been defined either. Recurrent manifestations of the disease during the various monitoring periods were reported in about 10% of the cases [6,9,10]. The mortality from recurrent manifestations for the analysed period increases even up to 16%. Whether beta blockers or alpha blockers, and their combination can be effective in the relapse prevention has not been established so far. The experience with the application of cardioverter defibrillators for this reversible cardiomyopathy is limited and mainly reflects individual cases only. The definitive criteria for their implantation still do not exist.

4. Conclusion

Takotsubo cardiomyopathy was first recognised in 1991. The Mayo Clinic diagnostic criteria are accepted. Its etiology has not yet been defined and it is most likely multicausal. Acute treatment focuses on the medical care of cardiac arrest, heart weakness, and disorders of heart rhythm.

Our case reports a rare form of Takotsubo cardiomyopathy in pregnancy followed by a malignant heart rhythm disorder, i.e. ventricular fibrillation. It has yet not been established whether pregnancy predisposes Takotsubo cardiomyopathy. The criteria for implantation of cardioverter defibrillators in the Takotsubo cardiomyopathy with malignant cardiac rhythm are not yet defined; instead the criteria are determined on a case-by-case basis.

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