

Broken Heart Syndrome or Tako-Tsubo cardiomyopathy

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ABSTRACT

Tako-tsubo cardiomyopathy is an acute cardiac syndrome that mimics acute ST-segment elevation myocardial infarction in clinical presentation. During acute presentation the shape of the left ventricle resembles a Japanese fishing pot (Tako-tsubo) used to trap octopus. Characteristic presentation is in post-menopausal women with chest pain and dyspnea with a preceding stressful event, physical or emotional, present in more than half of the patients. The left ventricular dysfunction usually recovers in a matter of days to weeks with excellent long term prognosis. The case reported here is of a 67 year old female without any past history of coronary artery disease who presented to the clinic with acute onset of chest pressure radiating to the left arm with no ischemic changes on the EKG but elevated cardiac enzymes. She had a preceding emotional event prior to her presentation. She was treated medically as for Non-ST-Segment Myocardial Infarction. She had decreased Ejection fraction during presentation with no evidence of CAD on angiogram. She underwent stress management and relaxation techniques as she was not able to tolerate any medications and had a complete recovery of ejection fraction on a repeat Echocardiogram in 6 months.

Key words: Tako-tsubo cardiomyopathy, stress, women

Citation

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INTRODUCTION

Tako-tsubo cardiomyopathy (Stress induced cardiomyopathy, Broken heart syndrome or Transient left ventricular apical ballooning syndrome) was first described by Dote et al in 1991¹.

It is an acute cardiac syndrome that mimics acute ST-segment elevation myocardial infarction. The name Tako-tsubo refers to the characteristic shape of the left ventricle during the acute presentation that resembles a Japanese fishing pot (Figure 1) with a narrow neck and round bottom, used to trap octopus. The disease is observed predominantly in post-menopausal women, with chest pain and dyspnea being the most common presenting symptoms²⁻⁶. Syncope, palpitations, nausea, vomiting, hypotension, shock, ventricular

fibrillation, and cardiac arrest may be other presenting symptoms in a minority of the cases³. A preceding stressful event, physical or emotional, is present in more than half of the patients²⁻⁶. The typical scenario in more than a third of the patients includes the following: transient left ventricular systolic dysfunction, ECG changes, and elevation of myocardial enzymes²⁻⁶. Arrhythmic changes such as sinus bradycardia, atrioventricular block, atrial fibrillation and ventricular tachycardia or fibrillation also may be seen⁵. The left ventricular dysfunction usually recovers in a matter of days to weeks²⁻⁶, with the long term prognosis being usually excellent^{5,6}.

CASE PRESENTATION

A 67-year old female with no past history of coronary artery disease presented to the clinic with acute onset of chest pressure radiating to the left arm. She had experienced one similar episode the previous night, which resolved over 10 minutes. The patient reported undergoing an overwhelming amount of stress since the previous day. On presentation, the patient was hemodynamically

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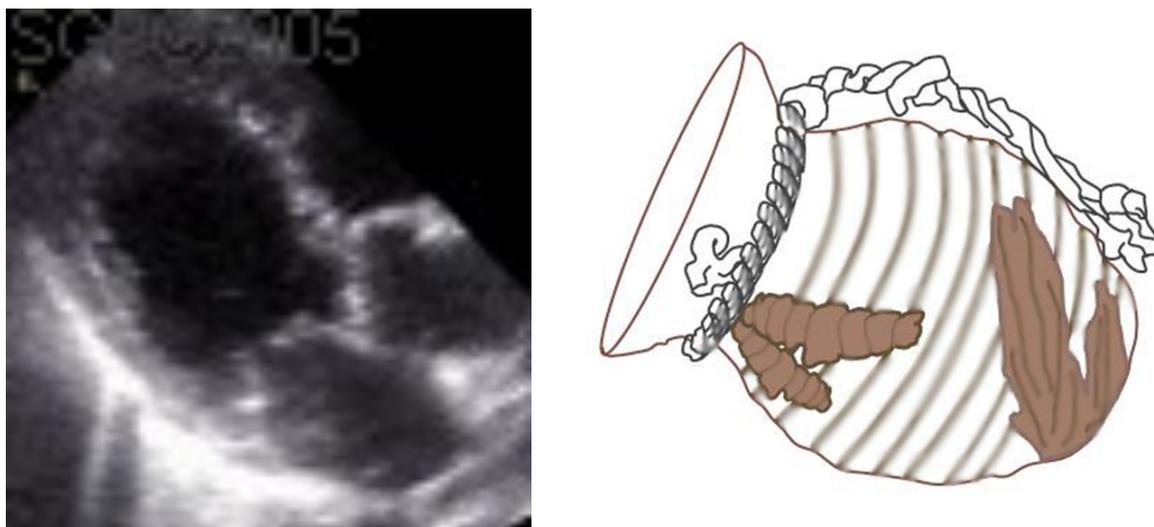


Figure 1. Shape of left ventricle in Tako-tsubo syndrome like an octopus trap



Figure 2. Echocardiogram: Four chamber view — Patient's normal echocardiogram in December 2009 prior to Tako-tsubo syndrome



Figure 3. Echocardiogram: Four chamber view — Patient's echocardiogram in Tako-tsubo syndrome. Note the apical hypokinesis (double arrows) and narrow neck (single arrow)

stable, but exceedingly depressed with teary eyes. Otherwise the physical examination was unremarkable with no jugular venous distension, clear lung fields, regular rate and rhythm, and no edema. An electrocardiogram (EKG/ECG) done

in the clinic did not show any acute ischemic changes, revealing only diffuse non-specific changes. However, cardiac enzymes, Creatinine Kinase/CK-MB (20.9ng/ml) and Troponin-I



Figure 4. Cardiac angiogram with normal vessels — Patient's angiogram showing vessels in Tako-tsubo syndrome

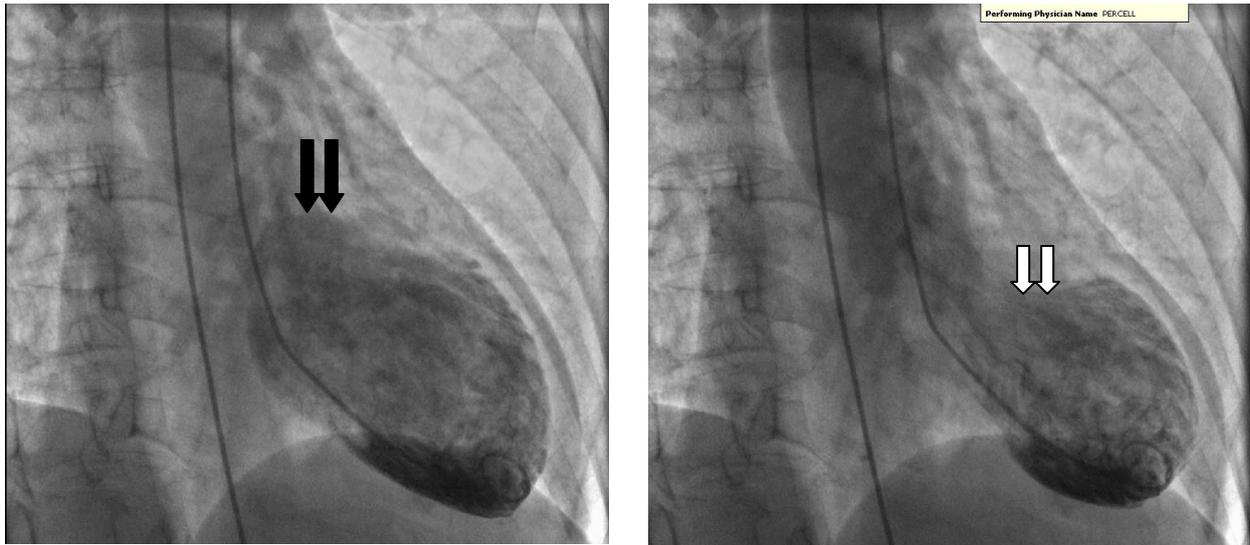


Figure 4. Left ventriculogram: diastole and systole - Patient's angiogram in March 2010 during Tako-tsubo syndrome. Note apical hypokinesis (white arrows) and narrow neck (black arrows)



Figure 6. Echocardiogram: Four chamber view — Patient's echocardiogram after recovery in May 2010. Note absence of apical ballooning

(3.39 ng/ml) were markedly elevated. BNP on admission was 390 pg/ml while other chemistries (parameters) were essentially normal. These peak values noted at the time of admission normalized over the next 48 hours. The patient was subsequently admitted to the inpatient unit and was managed as a standard case of non-ST elevation myocardial infarction, with beta-blockers, ace inhibitors, statins, nitrates, heparin and plavix. An echocardiogram performed on admission revealed an ejection fraction of 40%, which was significantly reduced compared to a normal echocardiogram done three months ago (Figures 2 and 3). Apical and distal inferior wall hypokinesis was noted, a finding observed since the previous echocardiogram. An angiogram performed on the following day did not reveal any significant coronary lesions (Figure 4). The findings on the angiogram were consistent with

non-ischemic dilated cardiomyopathy with significantly depressed left ventricular ejection fraction of 35% (Figure 5).

The patient improved with supportive care. The characteristic clinical presentation, and wall motion abnormalities on the echocardiogram with normal coronary arteries allowed us to diagnose this patient as a case of Tako-tsubo cardiomyopathy. After discharge from the hospital, several attempts were made to start the patient on digoxin, beta blockers and ace inhibitors. However, she could not tolerate even small doses of these medications as she developed significant hypotension. Ultimately, all cardiac medications were discontinued. She was taught healthy stress management and relaxation techniques. Her repeat echocardiogram after six months revealed complete recovery of the apical hypokinesia with normalization of the left ventricular systolic function (Figure 6). She has been doing well for the past two years

DISCUSSION

Between 0.7% and 2.5% of all patients with acute coronary syndrome (ACS) symptoms may have Tako-tsubo cardiomyopathy^{3,4,6}. The majority of the initial cases were reported in Japan, but this condition subsequently has been recognized in the United States and Europe^{7,8}. Over 80% of patients with Tako-tsubo cardiomyopathy have acute EKG changes with ST segment elevation, T-wave inversion being the most common feature^{2,3}. No predictors of clinical outcome have been

established thus far. A recent study⁶ concluded that the overall prognosis of patients with Tako-tsubo cardiomyopathy was excellent, with fairly low mortality, and all non-survivors having had ischemic EKG changes. Underlying non-cardiac diseases were found to be the only independent predictors of long-term mortality. The pathophysiology of Tako-tsubo cardiomyopathy is still not clearly delineated, but many studies have consistently reported elevated catecholamine levels in these patients during acute phase. Exaggerated sympathetic stimulation, ischemic myocardial stunning due to epicardial coronary spasm, acute coronary microvascular dysfunction, and catecholamine-mediated direct myocardial injury have been cited as possible mechanisms for the pathophysiology in this syndrome^{9,10}. The patient reported here had a typical presentation with the signature features of the syndrome such as female gender, postmenopausal status, presentation of chest pain following an emotional stressor with cardiac wall motion abnormalities, left ventricular dysfunction, mild release of myocardial enzymes, and elevated BN peptide level with normal coronary angiogram²⁻⁵, which had been reported in previous systematic reviews. This patient was atypical due to the absence of any acute ischemic EKG changes on presentation and afterwards. Another unusual feature was that her complete cardiac recovery was spontaneous facilitated only by stress management and relaxation techniques as she was not able to tolerate any medications that are normally used to improve cardiac function in the standard treatment of cardiomyopathy.

CONCLUSION

Tako-tsubo cardiomyopathy is an important differential diagnosis to be considered in postmenopausal women who present with symptoms of acute coronary syndrome. The diagnosis is suggested based on typical echocardiogram findings with no evidence of coronary artery

disease on angiogram. The typical echocardiogram findings include left ventricular wall motion abnormalities resembling the Japanese octopus trap fishing pot. The management includes supportive care, antiplatelet and antithrombotic agents. Long term outcome is excellent with exceedingly low mortality rates.

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